



BULLETIN

MEMPHIS STATE UNIVERSITY

Graduate Issue 1973-1974

DEADLINE DATES

For those who expect to receive a Master's, Specialist or Doctorate on:				
	August 11 1973	December 22 1973	May 11 1974	August 17 1974
Last Day For:				
Filing "Intent to Graduate Card"	May 30	Sept. 7	Jan. 17	June 5
Final submission of theses and dissertations to the Graduate Office	Aug. 3	Dec. 14	May 3	Aug. 9
"Application to Candidacy Forms" SHOULD be filed after the completion of twelve semester hours. They MUST be filed before the first day of classes for the semester in which the student plans to graduate.	May 30	Sept. 7	Jan. 17	June 5

ADDITIONAL REQUIREMENTS

Immediately after assignment of a thesis topic, the student MUST submit an "Application to Write A Thesis" to the Graduate Office.

A "Comprehensive Reminder" form MUST be filed with the Graduate School office one month before the scheduled date of the student's comprehensive examination.

Bulletin of Memphis State University—
Graduate School Issue

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March, 1973

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OF
MEMPHIS STATE
UNIVERSITY

*The sixty-second session
will open Thursday, August 30, 1973*

GRADUATE ISSUE 1973-74

MARCH 1973
MEMPHIS, TENNESSEE

Directory for Correspondence

Inquiries will receive attention if addressed to the administrative offices below at Memphis State University, Memphis, Tennessee 38152.

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CALENDAR

1973

JANUARY							FEBRUARY							MARCH						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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1974

JANUARY							FEBRUARY							MARCH						
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27	28	29	30	31			24	25	26	27	28	29	30	29	30	31				

Calendar

FALL SEMESTER, 1973

August 30, Thursday	Meeting of the new members of the University faculty, University Center Ballroom, 9 a.m.
August 31, Friday	Meeting of the entire University faculty, University Center Ballroom, 9 a.m.
August 31, Friday	Meeting of the University faculty by colleges and departments, 2 p.m.
September 1, Saturday	Registration, The Graduate School
September 3, Monday	Holiday: Labor Day
September 4, Tuesday through	Registration Week. For detailed dates and times, see the <i>Bulletin</i> (Schedule of Classes) for the Fall Semester, 1973.
September 6, Thursday	Classes meet as scheduled.
September 7, Friday	Last day for making application to the Dean of The Graduate School for degrees to be conferred December, 1973. (File the "Intent to Graduate" card.)
September 13, Thursday	Last day for adding courses.
September 25, Tuesday	Last day for removing summer session 'Incomplete' grades.
September 27, Thursday	Last day for dropping courses.
October 5, Friday	Holiday: West Tennessee Education Association
October 11, Thursday	English Proficiency Examination
November 1, Thursday	Mid-Semester deficiency reports due in the Records Office.
November 20, Tuesday	Last day to withdraw from the University.
November 22, Thursday through	Thanksgiving Recess
November 25, Sunday	
December 13, Thursday	Study Day
December 14, Friday	Final Examinations Begin
December 22, Saturday	Commencement

SPRING SEMESTER, 1974

January 12, Saturday	Registration, The Graduate School
January 14, Monday through	Registration Week. For detailed dates and times, see the <i>Bulletin</i> (Schedule of Classes) for the Spring Semester, 1974.
January 16, Wednesday	Classes meet as scheduled.
January 17, Thursday	Last day for making application to the Dean of The Graduate School for degrees to be conferred May, 1974. (File the "Intent to Graduate" card.)
January 23, Wednesday	Last day for adding courses.

February 5, Tuesday	Last day for removing Fall Semester "Incomplete" grades.
February 6, Wednesday	Last day for dropping courses.
February 21, Thursday	English Proficiency Examination.
March 10, Sunday through	Spring Holidays
March 17, Sunday	
March 20, Wednesday	Mid-term deficiency reports due in the Records Office.
April 11, Thursday	Last day to withdraw from the University.
May 2, Thursday	Study Day
May 3, Friday	Final Examinations begin.
May 11, Saturday	Commencement

PRE-SUMMER SESSION, 1974

May 13, Monday	Registration
May 14, Tuesday	Classes meet as scheduled
May 14, Tuesday	Last day for late registration
May 28, Tuesday	Last day to withdraw
May 31, Friday	Final examinations

SUMMER SESSIONS, 1974

June 3, Monday
through
June 4, Tuesday
June 5, Wednesday

June 7, Friday
June 11, Tuesday
June 20, Thursday
June 25, Tuesday

July 4, Thursday
July 5, Friday
July 11, Thursday

July 15, Monday
July 16, Tuesday
July 18, Thursday
July 22, Monday
August 9, Friday
August 16, Friday
August 17, Saturday

FIRST SUMMER TERM

Registration. For detailed dates and times, see the *Bulletin* (Schedule of Classes) for the Summer Session, 1974.

Classes meet as scheduled.
Last day for making application to the Dean of The Graduate School for degrees to be conferred August, 1974. (File the "Intent to Graduate" card.)

Last day for adding first term courses.
Last day for dropping first term courses.
English Proficiency Examination
Last day for removing Spring Semester "Incomplete" grades.

Holiday: Independence Day
Last day to withdraw from the University (first term)
Final examinations begin for the first term

SECOND SUMMER TERM

Course Adjustment Day
Classes meet as scheduled.
Last day to add second term courses.
Last day for dropping second term courses.
Last day to withdraw from the University (second term)
Final examinations
Commencement

EXTENDED SUMMER TERM

June 3, Monday
 through
 June 4, Tuesday
 June 5, Wednesday

Registration. For detailed dates and times, see the *Bulletin* (Schedule of Classes) for the Summer Session, 1974.

Classes meet as scheduled.

Last day for making application to the Dean of The Graduate School for degrees to be conferred August, 1974. (File the "Intent to Graduate" card.)

June 7, Friday
 June 13, Thursday
 June 20, Thursday
 June 25, Tuesday

Last day to add extended term courses.

Last day to drop extended term courses.

English Proficiency Examination

Last day for removing spring semester "Incomplete" grades.

July 4, Thursday
 July 11, Thursday
 through
 July 12, Friday
 July 15, Monday
 July 25, Thursday

Holiday: Independence Day

Mid-Term Break


Study day

Last day to withdraw from the University. (extended term courses)

August 16, Friday
 August 17, Saturday

Final examinations

Commencement



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Faculty and Staff

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DEVOY A. RYAN <i>Professor of Education</i>	Summer 1974
HARRY H. ELWELL <i>Professor of Marketing</i>	Summer 1973

APPOINTED MEMBERS

	TERM EXPIRES
ELNA B. McBRIDE <i>Professor of Mathematics</i>	Summer 1975
T. S. WU <i>Professor of Civil Engineering</i>	Summer 1974
WILLIAM B. BREWER <i>Professor of Spanish</i>	Summer 1973

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WILLIAM LEO AMMINGER, *Professor of Engineering*

Ph.D. (1963), Washington University.

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Ed.D. (1967), Mississippi State University.

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Ph.D. (1962), Mississippi State University.

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Ph.D. (1943), University of Iowa.

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Ph.D. (1961), University of Washington.

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Ed.D. (1964), Colorado State College.

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Doctor of Philosophy and Letters (1940), University of Madrid.

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Ph.D. (1957), University of North Carolina.

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Ph.D. (1952), University of Texas.

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Ed.D. (1968), University of Southern Mississippi.

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Ph.D. (1966), University of Wisconsin.

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ROBERT STUART CURBO, *Associate Professor of Accountancy*

M.B.A. (1958), University of Mississippi; C.P.A. (1965), Mississippi.

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Ph.D. (1962), University of Tennessee.

WALTER ELZIE DANLEY, *Professor of Education*

Ed.D. (1965), University of Mississippi.

ROBERT ELMER DAVIS, *Professor of Guidance and Personnel Services*

Ed.D. (1962), University of Mississippi.

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Ph.D. (1963), Louisiana State University.

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Ph.D. (1962), The Ohio State University.

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Ph.D. (1965), University of Texas.
- JOONG FANG, *Professor of Philosophy and Mathematics*
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Ph.D. (1964), Purdue University.
- VICTOR FEISAL, *Associate Professor of Biology*
Ph.D. (1966), University of Georgia.
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Ph.D. (1967), University of Southern California.
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Ph.D. (1970), University of Illinois.
- MAX LUSTIG, *Assistant Professor of Chemistry*
Ph.D. (1962), University of Washington.
- JAMES RAYMOND McCANN, *Adjunct Professor of Psychology*
Ph.D. (1955), Vanderbilt University.
- STEPHEN D. MALIN, *Associate Professor of Speech and Drama*
Ph.D. (1968), University of Florida.
- ROBERT R. MARCHINI, *Assistant Professor of Physics*
Ph.D. (1968), Clemson University.
- MORRIS H. MIDDLETON, *Assistant Professor of Psychology*
Ph.D. (1968), University of Arkansas.

KELL FREEMAN MITCHELL, JR., *Associate Professor of History*
Ph.D. (1966), University of Georgia.

SAM BURGE MORGAN, *Adjunct Professor of Psychology*
Ph.D. (1964), University of Arkansas.

CHARLES FRANK MORRIS, *Assistant Professor of Electrical Engineering*
Ph.D. (1970), Georgia Institute of Technology.

JUNE ROSE MORRIS, *Assistant Professor of Secondary Education*
Ed.D. (1972), University of Mississippi.

PATRICIA MURRELL, *Associate Professor of Guidance and Personnel Services*
Ed.D. (1968), University of Mississippi.

HELEN R. NUNN, *Professor of Home Economics*
Ph.D. (1966), Cornell University.

VAN NORWOOD OLIPHANT, *Associate Professor of Management*
D.B.A. (1969), Mississippi State University.

MICHAEL McDONALD OSBORN, *Professor of Speech and Drama*
Ph.D. (1963), University of Florida.

GEORGE D. OSBORNE, *Associate Professor of Music*
M.M. (1964), Indiana University.

RICHARD H. PAIGE, *Professor of Music*
D.M.E. (1960), Teachers College, Columbia University.

ARNOLD GRANT PARKS, *Associate Professor of Foundations of Education*
Ph.D. (1969), St. Louis University.

DEAN A. PEASE, *Assistant Professor of Health, Physical Education and Recreation*
Ph.D. (1970), University of New Mexico.

JOHN J. PEPIN, *Associate Professor of Marketing*
Ph.D. (1969), University of Mississippi.

EDWARD HARRIS PERRY, *Assistant Professor of Mechanical Engineering*
Ph.D. (1970), California Institute of Technology.

DREXEL A. PETERSON, *Assistant Professor of Anthropology*
Ph.D. (1971), Harvard University.

JAMES CECIL PHILPOT, *Associate Professor of Elementary Education*
Ed.D. (1968), University of Alabama.

JOSEPH PAUL PRICE, *Assistant Professor of Health, Physical Education, and Recreation*
Re.D. (1972), Indiana University.

- C. S. PYUN, *Associate Professor of Economics*
Ph.D. (1966), University of Georgia.
- GABRIEL PERRY RACZ, *Professor of Economics*
Ph.D. (1942), University of Budapest.
- FRANKLIN B. RAINES, *Associate Professor of Foundations of Education*
Ed.D. (1968), University of Tennessee.
- THOMAS ARTHUR RAKES, *Assistant Professor of Elementary Education*
Ed.D. (1972), University of Tennessee.
- DONALD L. RAMPP, *Associate Professor of Audiology and Speech Pathology*
Ph.D. (1967), University of Oklahoma School of Medicine.
- WILLIAM E. RAY, *Assistant Professor of English*
Ph.D. (1971), University of North Carolina.
- LETICIA GAYLE RAYBURN, *Associate Professor of Accountancy*
Ph.D. (1966), Louisiana State University; C.P.A. (1962), Mississippi, 1963, Louisiana.
- JOSEPH EUGENE REDDEN, *Associate Professor of Foundations of Education*
Ed.D. (1963), North Texas State University.
- JOHN JOSEPH REID, *Associate Professor of Economics*
Ph.D. (1962), University of Virginia.
- BILLY G. REYNOLDS, *Assistant Professor of Secondary Education*
Ed.D. (1969), University of Tennessee.
- H. LYNDALL RICH, *Associate Professor of Special Education and Rehabilitation*
Ph.D. (1969), Syracuse University.
- ELIZA LUCINDA RIDGWAY, *Assistant Professor of Spanish*
Ph.D. (1970), Louisiana State University.
- PAUL M. RIDGWAY, JR., *Assistant Professor of Biology*
Ph.D. (1971), Louisiana State University.
- RAYMOND BURTON ROBBINS, *Associate Professor of Management*
Ph.D. (1969), University of Arkansas.
- NICHOLAS W. ROKAS, *Assistant Professor of Foreign Languages*
Ph.D. (1972), University of Missouri.
- CECIL C. ROUSSEAU, *Assistant Professor of Mathematics*
Ph.D. (1968), Texas A & M University.
- BRIAN S. RUNGELING, *Adjunct Assistant Professor of Management*
Ph.D. (1969), University of Kentucky.

JERALD O. SAVELLS, *Assistant Professor of Sociology*
Ph.D. (1971), Louisiana State University.

RICHARD H. SCHELP, *Assistant Professor of Mathematics*
Ph.D. (1970), Kansas State University.

JOHN WILLIAM SCHIFANI, *Assistant Professor of Special Education and Rehabilitation*
Ed.D. (1971), University of Alabama.

WILLIAM L. SCOTT, *Assistant Professor of Finance, Insurance, and Real Estate*
Ph.D. (1971), University of Houston.

WILLIAM RODRICK SEWELL, *Associate Professor of Psychology*
Ph.D. (1967), University of Alabama.

NASEEB SHAHEEN, *Assistant Professor of English*
Ph.D. (1969), University of California at Los Angeles.

LEE SILVERTHORN, *Adjunct Professor of Psychology*
Ph.D. (1957), Kansas University.

CARL EDWARD SKEEN, *Assistant Professor of History*
Ph.D. (1966), The Ohio State University.

DENNIE LEE SMITH, *Associate Professor of Elementary Education*
Ed.D. (1969), Auburn University.

GERALD P. SMITH, *Assistant Professor of Sociology*
Ph.D. (1971), University of Missouri.

JOHN WARREN SMITH, *Assistant Professor of Engineering*
Ph.D. (1968), University of Missouri at Rolla.

RICHARD LINDSEY SPRECKELMEYER, *Associate Professor of Foundations of Education*
Ph.D. (1970), University of Iowa.

BILLY GENE STALLINGS, *Associate Professor of Accountancy*
D.B.A. (1969), Mississippi State University; C.P.A. (1963), Tennessee.

BOBBY JOE STARK, *Associate Professor of Management*
D.B.A. (1969), University of Oregon

RICHARD STEFF, *Assistant Professor of Music*
M.M. (1960), Eastman School of Music, University of Rochester.

EVERETT L. SUTTER, *Adjunct Professor of Psychology*
Ph.D. (1952), University of Texas.

K. PETER TAKAYAMA, *Associate Professor of Sociology*
Ph.D. (1971), Southern Illinois University.

JOSEPH ROWAN TAYLOR, *Assistant Professor of Accountancy*
M.B.A. (1949), University of Texas; C.P.A. (1948), Texas; C.P.A. (1952), Tennessee.

CHARLES E. TEMPLETON, *Assistant Professor of Accountancy*
M.A. (1962), Memphis State University; C.P.A. (1954), Tennessee.

MARION R. THOMPSON, *Associate Professor of Special Education
and Rehabilitation*
Ed.D. (1970), Illinois State University.

JOHN OLIVER THOMSON, *Associate Professor of Physics*
Ph.D. (1956), University of Illinois.

DAVID J. WARK, *Assistant Professor of Audiology and Speech
Pathology*
Ph.D. (1971), Indiana University.

THAYER HOWARD WATKINS, *Associate Professor of Economics*
Ph.D. (1965), University of Colorado.

MAURICE A. WEATHERTON, *Associate Professor of Audiology
and Speech Pathology*
Ph.D. (1970), University of Kansas.

A. BERT WEBB, *Assistant Professor of Secondary Education*
Ed.D. (1971), University of Tennessee.

GEOFFREY RODERICK WEBB, *Assistant Professor of Mathe-
matics*
Ph.D. (1971), Duke University.

DONALD ROGER WELLS, *Associate Professor of Economics*
Ph.D. (1965), University of Southern California.

HENRY SCOTT ZURHELLEN, *Assistant Professor of Foundations
of Education*
Ed.D. (1970), University of Tennessee.

2

General Information

Objectives of The Graduate School.

The Graduate School of Memphis State University is the center of advanced study and research within the University. The basic objectives of The Graduate School are (a) to preserve and disseminate knowledge now available in the humanities, the sciences, and the various professional areas represented by the various departmental graduate faculties; (b) to extend knowledge through basic research; and (c) to prepare men and women to assume a more responsible and useful role in society.

Organization of The Graduate School.

The Graduate School is under the direction of The Graduate Council. The Council is composed of the President of the University, the Dean of The Graduate School, the chairman of each department offering a graduate major, and a departmental representative for each department offering graduate courses. The Executive Committee of The Graduate Council and The Graduate Déan are empowered to make decisions within the policies approved by The Graduate Council. Three members of the Executive Committee are elected by the Council and three are appointed by the President of the University.

Students admitted to The Graduate School are responsible to The Graduate Council through the Executive Committee and the Dean of The Graduate School. Any member or associate member of the Graduate Faculty may act as a major or collateral area adviser to students in the respective departments.

Library Facilities.

The new 12-floor John Willard Brister Library complex was completed in 1968. The library contains over a million items and features a complete Mississippi Valley Collection. In addition, libraries in Law, Chemistry, Education, Engineering, Music, and Communication Disorders are considered to be among the most complete in the Mid-South area.

Computer Facilities.

In addition to the Data Processing Center, the University operates a Computer Center. Whereas the Data Processing Center serves the administrative needs of the University, the Computer Center is available for research and instruction.

Auxiliary Facilities.

The University Center is located on the east side of the mall and was opened in 1968. It houses the University Bookstore and, in addition, provides a variety of food service, recreational, and conference facilities.

Chucalissa, prehistoric Indian town and museum situated in the southwest corner of Shelby County on Mitchell Road, is operated by the University as a research and training facility. Excavation of the site is being undertaken with students performing the archaeological field work under staff supervision. Adjoining acreage serves as a biological field station. Chucalissa also provides indoor and outdoor archaeological exhibits open to the public throughout the year.

The University has acquired 146 acres of land, formerly the *Kennedy Veterans' Hospital site* at Park and Getwell. This land is being developed for University facilities and programs.

The 623-acre *Meeman Forest Farm* was a gift to the University from the trustees of the Edward J. Meeman Foundation. The late Mr. Meeman was for 31 years editor of the *Memphis Press-Scimitar*.

Research and Service Activities.

In addition to individual faculty, student, and departmental programs of research and public service, the following organized units conduct public service and research activities.

Bureau of Business and Economic Research.

The Bureau of Business and Economic Research is located in the College of Business Administration Building. The Bureau serves as the organized research unit of the Business Administration College, and serves business firms, governments, and trade associations in their needs for research and special studies. It also serves to train students in methods of research.

Bureau of Educational Research and Services.

The Bureau of Educational Research and Services conducts research and development projects for educational agencies at local, state, and national levels. It serves in a coordinative and administrative role for educational studies, surveys, evaluations, consultant activities and other field services for the College of Education. Emphasis is placed on projects that have impact on the needs of West Tennessee and the Mid-South area and that are conducted through the cooperative efforts of faculty and students of the College of Education and other divisions of the University and educators in the local schools. All contract activities for the College of Education are channeled through the Bureau of Educational Research and Services where administrative support is provided. The primary thrust of the Bureau is service — to faculty, students, and outside educational agencies. Limited support is available for undergraduate and graduate students who desire work on funded research projects.

Bureau of Social Research.

The Bureau of Social Research in the Department of Sociology serves as a supplemental resource to the integrated teaching, service, and research commitment of the University. The Bureau is designed to develop an awareness and knowledge of community social conditions and problems. The efforts of the Bureau focus primarily on the metropolitan area of Memphis, the State of Tennessee, and the general region influenced by the Memphis area.

Center for Manpower Studies.

The objective of the Center for Manpower Studies in the College of Business Administration, (a consortium between the University of Mississippi and Memphis State University) is to develop in students selecting the manpower speciality, the knowledge, skills, perspectives, and scholarly motivation to perform efficiently the functions of manpower planning, administration, and teaching. The Center staff also conducts research in manpower problems of regional and national scope. The program provides a unique interdisciplinary approach to the theory and practice of the development and utilization of human resources by combining a thorough grounding in the social sciences with the study of manpower utilization, manpower planning and policies, and labor market operations and the practical aspects of problem solving and "on-the-job" experience (internships).

Engineering Research Institute.

The Engineering Research Institute operates under the College of Engineering for the purpose of promoting research and service projects from all of the academic areas of the Engineering College. The Institute cooperates closely with other university research bureaus and departments to promote interdisciplinary projects. Particular emphasis is given to assist in the solution of problems affecting local industry and municipal and governmental agencies.

Institute of Governmental Studies and Research.

The Institute of Governmental Studies and Research in the Department of Political Science is located on the fourth floor of Clement Hall. It performs research and service for governmental agencies on matters of public policy and management. The Institute publishes the PUBLIC AFFAIRS FORUM and places student interns with government agencies.

The Psychology Clinic.

The Psychology Clinic is located on the first floor of the Psychology Building. It offers both psychological evaluations and therapeutic services to children and adults. For appointments or information, contact the Clinic.

The Reading Center.

The Reading Center is a branch of the Elementary Education Department in the College of Education. It is located in room 123 of the Education Building. The Center provides diagnostic and remedial reading services to the community. It also serves as a graduate training facility for the College of Education. Individuals interested in the diagnostic and remedial reading services of the Reading Center should contact the director.

Regional Economic Development Center.

The Center represents the University in its outreach function in the field of economic development planning. In providing technical and management assistance to the public and private sectors, the Center also serves as a laboratory for interdisciplinary research and service by faculty and graduate students in solving problems of urban and regional development. The Center's professional planning staff have academic appointments and teach courses in urban and regional planning.

Speech and Hearing Center.

Located at 807 Jefferson Avenue in the Medical Center of Memphis, this facility became affiliated with the University in 1967. It serves children and adults with speech and hearing defects. The University administers and operates the center in cooperation with the board of Memphis Speech and Hearing Center, Inc.

Extension Division.

Memphis State University has for a number of years conducted general education workshops. The increasing demand for these services has resulted in the organization of an Extension Division. The Extension Division was authorized by the State Board of Education in 1951 to afford an official avenue through which University services could be extended off-campus.

Graduate courses are offered through the Extension Division of Memphis State University at centers where suitable arrangements are made in advance. Regularly employed graduate faculty members listed in this Bulletin teach graduate extension courses. The subject matter taught in extension classes is the same as that offered on campus. Regulations regarding the approval of extension courses toward requirements for the Master's degree are found on page 70 of this Bulletin.

Where circumstances justify, the Extension Division attempts to provide various types of help to organized groups within the service area. This assistance may take the form of such activities as conferences, public addresses, consultative service, and other types of school and community aid. Regularly employed staff members of Memphis State University are available for this service.

To the end that an effective extension service may be conducted by Memphis State University, correspondence is invited with groups or individuals who are interested. Please address correspondence to:

EXTENSION DIVISION
Administration Building
Memphis State University
Memphis, Tennessee 38152

Admission To The Graduate School.

The Graduate School is open to persons holding the Bachelor's degree from colleges and universities recognized by standard, general or regional accrediting agencies, and whose undergraduate work has been of sufficient quality and scope to enable them to profitably pursue graduate study. Satisfactory scores are required on the Miller Analogies Test or the aptitude phase of the Graduate Record Examination for those students not holding the master's degree. Students planning to major in any area of Business Administration must take the Admission Test for Graduate Study in Business. The Departments of Biology and Psychology require the Graduate Record Examination score for admission. Applicants to the Department of Biology must also submit acceptable scores on the advanced phase of the Graduate Record Examination in the area of Biology. These tests may be taken in any institution approved to administer them. See the section on Graduate Programs for specific admissions requirements for the various degrees offered.

Admission to The Graduate School merely gives the privilege of taking course work. It does not in any way imply that the student is admitted to candidacy for an advanced degree.

Applications for admission to The Graduate School may be secured from the office of the Dean of The Graduate School; all inquiries should be addressed to that office. Students who wish to arrange for the Miller Analogies Test should call or write the Admission Testing Office (Administration Building). A \$5.00 fee, payable in the Business Office, is charged for the test. Registration packets for the Admission Test for Graduate Study in Business and Graduate Record Examination may be obtained from the Dean of The Graduate School. Students must register at least three weeks before the testing date.

Applicants for admission must have on file in the Graduate Office the following items to be considered for admission to the Graduate School: an application, entrance examination scores, and two official transcripts of their undergraduate and graduate credits. An application fee of \$5.00 is required at the time the application is submitted.

Applicants may be required to present evidence of good health, moral character, and intellectual capacity necessary for pursuing graduate study. An applicant who is denied admission to the Graduate School may appeal the decision to the Executive Committee of the Graduate Council if he feels that the denial was discriminatory or without sufficient justification.

Combination Student.

An undergraduate student at Memphis State University who is enrolled for courses which complete his undergraduate degree may apply for admission to begin graduate study and, in special cases, be allowed to register for graduate courses not to exceed a total of 15 semester hours of combined course work. (The student must meet all graduation requirements except for the number of hours and should have a 3.0 grade point average during his last year in school. In addition, the student must have passed the English proficiency test.) In the event he has failed a required course which has not been repeated with a satisfactory grade, he will be denied admission to The Graduate School as a combination student.

Readmission to the Graduate School.

Students who have previously attended The Graduate School and who have not attended for one or more semesters should apply for readmission. It is not necessary to apply for readmission if one fails to attend the summer session and was enrolled for the previous spring semester. Students who wish to apply for readmission should complete an application which is available in the Records Office, and return the completed application to that office.

Registration and Attendance.

After being notified of acceptance to The Graduate School, some students will be asked to arrange a personal conference with the Dean or his assistant. During this conference the Dean or his assistant will assign tentative advisers and will advise as to programs available in The Graduate School.

The student at this early interview will be expected to declare his major and collateral area of study. Students who have previously declared major and collateral areas of study but desire to make a change should arrange a conference with the Dean or his assistant in order that the records may be revised.

The current *Schedule of Classes* will contain complete information concerning registration procedures.

Adding, Dropping, or Changing Sections.

After a graduate student has completed his registration, changes cannot be made without approval of the appropriate university

officials. The adjustment will originate with the major adviser, and the change-of-course must have the approval of the student's major adviser.

Withdrawing From Graduate School.

Failure to give official notice of complete withdrawal from Graduate School in writing will result in a grade of "F" in each course for which the student was registered.

A withdrawal is not permitted within one week of the beginning of the final examination period of a semester or a summer term. Any student who withdraws after the drop period ends will have all courses not previously dropped recorded as: D.W.

Address your notice of withdrawal to:

DEAN, THE GRADUATE SCHOOL

Memphis State University

Memphis, Tennessee 38152

The student's Memphis State University identification card must be included with the notice of withdrawal. If a student withdraws with an unsatisfactory grade-point average, he must secure approval from the Graduate Dean for readmission. The adviser should examine the graduate transcript before granting approval for the withdrawal.

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Expenses and Aid

Expenses at University.

The matter of expense while attending the University is of importance to every student. It is difficult, however, to give specific information about yearly expenditures; expenses vary according to the nature of the curriculum, the place of residence (whether in Tennessee or in another state or country), and the student's own habits and needs. In any student body there are so many different tastes, as well as such a wide range of financial resources, that each student must determine his budget in keeping with his own needs and financial condition. It is possible to live simply, and to participate moderately in the life of the student community, on a modest budget. The best help the University authorities can offer the student in planning his budget is to inform him of certain definite expense items and to acquaint him with others for which he will in all probability have to provide.

The information in this section concerning tuition, fees, deposits, financial aid, etc. is applicable only to students enrolled in The Graduate School. Similar information for students in the undergraduate colleges and The School of Law is available in the bulletins of those colleges.

The listing of any fee or incidental charge in this bulletin does not constitute a contract between the University and the student. Because of rapidly changing conditions it may become necessary to alter a fee structure before the next edition of the *Bulletin* is published. As a condition of registration each student will pay the fees in effect at the time he registers.

Application Fee.

Each student submitting an application for admission to the Graduate School must pay, at the time he submits his application, a non-refundable fee of \$5.00.

Maintenance Fee.

All students who are residents of Tennessee pay a maintenance fee of \$17.00 per semester hour, not to exceed a maximum of \$189.00. Non-residents pay this same maintenance fee in addition to the tuition indicated in the following paragraph. Fees for audits will be assessed on the same basis as fees for credit. Students who have paid the maximum maintenance, plus the maximum tuition when applicable, are entitled to certain health services, admission to home athletic events, concerts, plays, social and other student-sponsored activities, and a subscription to the student newspaper, *The Helmsman*.

Tuition.

No charge is made for tuition to bona-fide residents of the State of Tennessee. Non-residents are charged tuition of \$30.00 per se-

mester hour, not to exceed a maximum of \$360.00. Tuition is in addition to the maintenance fee.

Residency Classification.

The Office of Admissions and Records is charged with the responsibility of assigning a residency classification to each student using regulations provided by the Board of Regents. The student may appeal the decision to the Committee on Residency. Residency regulations of the Board of Regents and information on appeals procedures are available in the Office of Admissions and Records.

The Summer Session.

The Summer Session consists of two separate terms of approximately six weeks each, plus an extended term for specified courses (see the calendar for specific dates). There is also a Pre-Summer term of three weeks with a limited number of courses offered. Charges for all of the above terms are assessed according to the number of hours for which the student registers. The current fee rate is \$17.00 per semester hour for students classified as residents, and \$47.00 per semester hour for students classified as non-residents for payment of fees.

Summer School Course Load Limitations

The maximum number of hours a graduate student may enroll for during the Summer Session is 12. These 12 hours may be earned in one of several options: (1) 6 hours in each of the Six-week terms, (2) 12 hours taken in the Extended term with no work taken during the Six-week terms, or (3) a maximum of 4 hours in the Extended term and 4 hours in each of the Six-week terms.

Fee Refunds.

If a student withdraws from the University within seven days from the beginning of classes for the fall and spring terms, a refund will be made of 80% of his maintenance fee and tuition or music fee (if any). Each week thereafter, the amount will be reduced 20%. *All other fees are non-refundable.*

For The Summer Session a refund of 80% of the maintenance fee and tuition or music fee (if any) is made if the student withdraws from the University within three school days from the beginning of classes. Each three school days thereafter, the amount will be reduced 20%. *All other fees are non-refundable.*

Residence Halls.

Charges for rooms in University residence halls are indicated

below. For information concerning application for rooms, contact the Office of University Housing.

	<i>Semester</i>	<i>6-Week Term</i>	<i>Extended Term</i>
Browning Hall (double room)	\$.154.00	\$58.00	\$106.00
Browning Hall (single room) . .	177.00	66.00	121.00
Hayden Hall (double room) . .	154.00	58.00	106.00
Hayden Hall (single room) . .	177.00	66.00	121.00
McCord Hall (double room) . .	154.00	58.00	106.00
McCord Hall (single room) . .	177.00	66.00	121.00
Mynders Hall (double room) . .	154.00	58.00	106.00
Mynders Hall (single room) . .	177.00	66.00	121.00
*Rawls Hall (double room) . .	177.00	66.00	121.00
*Rawls Hall (single room)	199.00	75.00	137.00
*Robinson Hall (double room) . .	177.00	66.00	121.00
*Robinson Hall (single room) . .	199.00	75.00	137.00
Smith Hall (double room)	154.00	58.00	106.00
Smith Hall (single room)	177.00	66.00	121.00
West Hall (double room)	154.00	58.00	106.00
West Hall (single room)	177.00	66.00	121.00

(All room charges are subject to change without notice.)

(All rates include telephone and post office box, but NOT long distance telephone bills.)

The following policy covers residence hall contracts, deposits, and rental fees:

1. All residence hall contracts are for the academic year, or for the entire summer session.
2. Each application for residence hall accommodations must be accompanied by a deposit of \$50.00. This deposit against damages shall remain on file with the University throughout the student's occupancy of housing facilities, and is refundable under the following conditions:
 - A. The housing application for fall or spring is withdrawn, in writing, on or before July 1 or December 1, respectively.
 - B. The housing application for any summer term is withdrawn, in writing, prior to May 1.
 - C. When a student is denied admission or re-entry to the University.
 - D. Refunds of the \$50.00 deposit will be reduced by the amount of any unpaid damages or any other financial obligation due the University at the time residence hall space is vacated.
3. An initial residence hall reservation request must be confirmed by a properly negotiated contract with deposit.

*Air Conditioned

4. Students who wish to retain their room and hall priority for subsequent semesters must notify the Housing Office in writing by July 1 for the fall semester, by December 1 for the spring semester, and by May 1 for summer sessions. Failure to give notice will result in forfeiture of deposit.
5. A housing contract can be cancelled and a refund of the \$50.00 advance rental payment will be made only when the following conditions exist:
 - A. The student is denied admission or re-entry to the University.
 - B. The student is prevented from entering the University because of medical reasons, such reasons confirmed in writing by a licensed physician.
 - C. The student is inducted into the armed services involuntarily. This does not include voluntary enlistment or the call to active duty by a student who voluntarily enters reserve duty.
 - D. Residence hall space is not available.
 - E. Reservations are cancelled prior to July 1 for the fall semester, December 1 for the spring semester, and May 1 for the summer session.
6. Refunds of residence hall rent after classes begin will be prorated on a weekly calendar basis when the following conditions exist:
 - A. The student is forced to withdraw from the residence hall because of medical reasons, such reasons being supported by a statement from a licensed physician.
 - B. Armed forces inductions as in item 5C above.
7. Students assigned as sole occupants of double rooms in order to satisfy their requests for a single room will be assessed the single-room fee.
8. Residence hall rental fees for the second summer term that are paid at the beginning of the first term of the summer session will be refunded to students who withdraw from the University before second term classes begin.

Married Housing.

The University has 126 apartments for married students located on South Campus approximately one mile from the central part of the campus. These are 70 two-bedroom and 56 one-bedroom apartments. Some apartments are built specifically for paraplegic students. All apartments are furnished with electric stove, refrigerator, carpeting and garbage disposers.

The monthly rental rates are: one bedroom apartment —

\$105.00; two bedroom apartment—\$125.00. Electrical utilities are paid by tenant.

Application forms may be obtained from the University Housing Office in Room 105, Scates Hall, Main Campus. A \$5.00 application fee is required when the application is submitted. A \$50.00 deposit is required upon acceptance of assigned apartment.

Meals.

The University Cafeterias, Student Center, and Vending Areas, open to all students, provide wholesome food at reasonable prices. The cost of meals per student is estimated at \$3.25 per day.

Late Registration.

Students who do not complete registration (including the payment of fees) during the official registration period will be charged \$5.00 for the first day after the official registration period and \$1.00 per day thereafter.

Adding and Dropping Courses.

A charge of \$3.00 per course will be made for each course which is added or dropped after the student has completed registration.

Transcripts.

One transcript of the student's academic record at Memphis State University is furnished free; a charge of \$1.00 is made for each additional copy requested. Transcripts are issued only at the request of the student or his authorized agent. Requests for transcripts should be filed with the Records Office. No transcript will be provided for a student who has any financial indebtedness to the University.

Automobile Registration.

Each person who expects to operate and park an automobile on the campus must register it in the traffic office (Room 130, Administration Building) and pay \$5.00 for an official permit, valid from September through August. Proof of ownership must be presented when registering the automobile. Residence hall occupants should ask for a special decal when registering their automobiles.

Identification Cards.

The University issues to each student an identification card, including his photograph, personal description, and certificate that he is enrolled as a student in the University. The card is required for registration, the borrowing of library books, the cashing of personal checks, and other purposes. *The card remains the prop-*

erty of Memphis State University and will be surrendered upon request of a university official. A charge of \$10.00 will be required for its replacement. A student will be charged \$2.00 to make any change in data on his card.

Bad Checks

It is expected that a check given in payment of any fee will clear the bank on which it is drawn. *If a check is returned, the fee is assumed to be unpaid and charges for late payment will be assessed.* A \$4.00 service charge will be assessed for each bad check, whether given in payment of fees or cashed by the University for the personal convenience of the student. Check-cashing privileges will be revoked for any student who has had checks returned by his bank more than once.

Laboratory Deposits.

Certain courses in chemistry and physics require breakage deposits, any unused portion of which is refunded.

Courses in Applied Music.

The fee for all private lessons in brasses, organ, percussion, piano, strings, woodwinds, and voice is \$50.00 per semester for one half hour per week. Full-time students who are majoring in music (those currently registered for music theory) will pay only one \$50.00 fee per semester.

Music Locker Deposit.

Music students are required to have a locker for storage of University owned musical instruments or equipment. Personal instruments may also be stored in lockers. A deposit of \$3.00 for one semester or \$4.00 for two semesters is required on each locker issued. This deposit, less a service charge of \$1.50 per semester, will be refunded upon return of the lock. Students will be expected to pay for any damages.

Additional Charges.

The University reserves the right to increase the charges listed herein or to add new ones whenever such increases or additions are found to be necessary.

Thesis.

The student will be required to present a receipt from the Business Office to the Graduate Office showing that he has paid a fee of \$4.00 for each copy of his thesis which is to be bound.

Dissertation.

A student completing the doctorate will be required to pay the \$4.00 fee for binding each copy of his dissertation and in addition a fee of \$35.00 to defray the cost of microfilming the dissertation and publishing the abstract.

Graduation Fee.

Each candidate for a degree from Memphis State University pays a \$15.00 fee to cover cost of the diploma, rental of cap and gown, and incidentals connected with the commencement exercises. This fee must be paid thirty days before graduation.

Graduate Assistantships.

MASTER'S LEVEL ASSISTANTSHIPS. Graduate assistantships for Master's degree students are available in most of the academic areas at Memphis State University. Full time assistants may anticipate from \$200 to \$250 per month salary and remission of registration fees.

DOCTORAL ASSISTANTSHIPS AND FELLOWSHIPS. Numerous opportunities are available for qualified students to participate in N.D.E.A., N.S.F., N.I.H., Industrial and Private Foundation Awards made to the University. Inquiries should be made to either the Departmental Chairman or Director of Graduate Studies of the appropriate department.

RESIDENT HALL ASSISTANTS. Head residents have the responsibility for a residence hall; apartments and salaries are negotiated. Resident advisers have hall responsibilities and receive room and \$90.00 per month. Inquiries should be sent to the Director of Housing.

4

Graduate Programs

Graduate Programs.

A wide variety of graduate programs of study are offered in The Graduate School of Memphis State University. Candidates for a degree must design a plan which has the approval of their major adviser, the departmental chairman, and the Graduate Dean.

Memphis State University offers Master's degrees, Education Specialist degrees, and Doctoral degrees. The Master's programs are: Master of Arts (M.A.), Master of Arts in Teaching (M.A.T.), Master of Business Administration (M.B.A.), Master of Education (M.Ed.), Master of Fine Arts (M.F.A.), Master of Music (M.M.), Master of Public Administration (M.P.A.), Master of Science (M.S.), and the Master of Science in Teaching (M.S.T.). In the area of Education, the degrees of Education Specialist (Ed.S.) and Doctor of Education (Ed.D.) are offered. The Doctor of Philosophy (Ph.D.) is awarded in Biology, Chemistry, History, Mathematics, and Psychology.

Every graduate student is expected to comply with the general requirements for the degree he is pursuing, as outlined elsewhere in the *Graduate School Bulletin* and *Policies of the Graduate School*. Copies of both publications are available in the departmental offices. In addition to the general requirements, the student will be expected to conform to the requirements of one of the departments of the University. The choice of the department in which the student is to major may, in large part, determine the degree he will seek, since the graduate degree should reflect the type of program the student has followed.

Following is an outline of the academic programs offered in The Graduate School.

ACADEMIC PROGRAMS

MASTER'S DEGREE

Department	Major	Concentrations Within Major (Possible)	Degree Offered
Accountancy	Accountancy		Master of Science
Audiology and Speech Pathology	Audiology and Speech Pathology	(1) Audiology (2) Speech Pathology	Master of Arts
Biology	Biology	(1) Botany (2) Cell Biology (3) Invertebrate Zoology (4) Microbiology (5) Vertebrate Zoology	Master of Science
Chemistry	Chemistry	(1) Inorganic (2) Analytical Chemistry	Master of Science

Department	Major	Concentrations Within Major (Possible)	Degree Offered
		(3) Organic (4) Physical Chemistry (5) Biochemistry	
Civil Engineering	Civil Engineering	(1) Environmental Engineering (2) Foundation Engineering (3) Structural Engineering (4) Transportation Engineering	Master of Science
College of Business Administration	Business Administration	(1) Accountancy (2) Finance, Insur- ance, Real Estate (3) Management (4) Marketing (5) Economics	Master of Business Administration
Distributive Education	Distributive Education		Master of Education
Economics	Economics		Master of Arts
Educational Administration and Supervision	Educational Administration and Supervision	(1) General (2) Elementary (3) Secondary (4) Superintendency	Master of Education
	Adult Education		Master of Education
Electrical Engineering	Electrical Engineering	(1) Solid State Electronics (2) Automatic Control Systems (3) Engineering Computer Systems (4) Microwave & Antenna Systems	Master of Science
Elementary Education	Elementary Education	No Concentration or (1) Early Childhood Education	Master of Education
	Reading		Master of Education
English	English		Master of Arts
Finance, Insur- ance, Real Estate	Finance		Master of Science
Foreign Lan- guage	French		Master of Arts
	German		Master of Arts
	Spanish		Master of Arts
Geography	Geography		Master of Arts Master of Science
Geology	Geology		Master of Science

GRADUATE PROGRAMS

Department	Major	Concentrations Within Major (Possible)	Degree Offered
Guidance and Personnel Services	Guidance and Personnel Services	(1) Elementary School Counsel- ing & Guidance (2) Secondary School Counsel- ing & Guidance (3) General Counsel- ing & Guidance	Master of Education
Health, Physical Education & Recreation	Health, Physical Education & Recreation	(1) Health (2) Physical Education (3) Recreation	Master of Education
History	History		Master of Arts
Interdepartmental Programs	Natural Science		Master of Science in Teaching
Library Service	Library Service		Master of Education
Management	Management		Master of Science
Marketing	Marketing		Master of Science
Mathematics	Mathematics	(1) General Mathematics (2) Statistics (3) Computer Sciences	Master of Science
Mechanical Engineering	Mechanical Engineering	(1) Design & Manufacturing (2) Nuclear & Thermal Power (3) Materials Sc. (4) Fluid & Solid Mechanics (5) Aerospace Propulsion	Master of Science
Music	Music	(1) Applied Music (a) Composition (b) Piano (c) Vocal Pedagogy (d) Vocal Performance (e) Organ (f) Strings (g) Brasses (h) Winds (i) Percussion (2) Sacred Music (3) Music Theory (4) Music History	Master of Music
		(5) Musical Arts: Music History (6) Musical Arts: Applied Music	Master of Arts
	Music Education		Master of Music Education

Department	Major	Concentrations Within Major (Possible)	Degree Offered
Office Administration	Business Education and Office Management		Master of Education
Philosophy	Philosophy		Master of Arts
Physics	Physics		Master of Science
Political Science	Political Science		Master of Arts
	Public Administration	(1) Urban Management and Planning (2) Comparative and Development Administration (3) General	Master in Public Administration
Psychology	General Psychology	(1) General Psychology (2) Clinical Psychology	Master of Arts Master of Science
	School Psychology		Master of Arts
Secondary Education	Secondary Education		Master of Education Master of Arts in Teaching
Sociology	Sociology		Master of Arts
Special Education and Rehabilitation	Special Education and Rehabilitation	(1) Mental Retardation (2) Learning Disabilities (3) Emotionally Disturbed (4) Deaf Education (5) Multihandicapped (6) Vocational Rehabilitation	Master of Education
Speech and Drama	Speech and Drama	(1) Radio-TV-Film (2) Rhetoric and Communication Arts (3) Theatre & Oral Interpretation	Master of Arts
	Theatre		Master of Fine Arts
Engineering Technology	Technical Education	(1) Architectural (2) Construction (3) Drafting & Design (4) Electronics (5) Manufacturing (6) Industrial Arts	Master of Science

ACADEMIC PROGRAMS

ADVANCED DEGREES

Department	Major	Concentrations Within Major (Possible)	Degree Offered
Biology	Biology	(1) Botany (2) Cell Biology (3) Invertebrate Zoology (4) Microbiology (5) Vertebrate Zoology	Doctor of Philosophy
Chemistry	Chemistry	(1) Inorganic (2) Organic (3) Physical Chemistry (4) Analytical Chemistry (5) Biochemistry	Doctor of Philosophy
Educational Administration & Supervision	Educational Administration & Supervision	(1) Superintendency (2) Elementary (3) Secondary (4) Higher Education	Education Specialist Education Specialist Education Specialist Doctor of Education
		No Concentration	Doctor of Education
Guidance and Personnel Services	Personnel Services	(1) Counseling & Guidance	Education Specialist
		(2) Student Personnel Services	Doctor of Education
History	History		Doctor of Philosophy
Interdepartmental Programs	Curriculum and Instruction	No Concentration or (1) Elem. Ed. (2) Reading (3) Sec. Ed. (4) Higher Ed. (5) English Ed. (6) Foundations of Education (7) Music Ed. (8) Sc. Ed. (9) Bus. Ed.* (10) Social Studies Education (11) Mathematics Education (12) Special Education and Rehabilitation	Education Specialist Doctor of Education

* Moratorium in effect as of catalog printing.

Department	Major	Concentrations Within Major (Possible)	Degree Offered
Mathematics	Mathematics	(1) College Teaching	Doctor of Philosophy
Psychology	Psychology	(1) Clinical Psychology (a) Neuropsychology (b) Behavior Management (2) Experimental Psychology (a) Biopsychology (b) Learning-Behavior Analysis (c) Sensory Processes (d) Neuropsychology (e) Behavior Management (3) Human Psychology (a) Human Developmental Retardation (b) Industrial Psychology (c) Personality-Cognitive Processes (d) Social Psychology (e) Neuropsychology (f) Behavior Management	Doctor of Philosophy

Master's Degree.

The program for the MASTER OF ARTS degree is generally open to those who have completed the Bachelor of Arts degree. Others may enroll for the M.A. degree if undergraduate prerequisites are met. Departmental requirements with reference to thesis, language, and course requirements are outlined on pages 80 to 249 of the Bulletin. Students majoring in the following areas are generally expected to seek the Master of Arts degree: Audiology and Speech Pathology, English, Geography, History, Modern Languages, Music (Applied), Music History, and Music Theory, Political Science, Psychology, Sociology, and Speech and Drama. Economics majors may choose to apply for this degree also.

The programs for the MASTER OF ARTS IN TEACHING degree are designed for a selected group of students who offer out-

standing undergraduate academic records. The degree is awarded in the Department of Secondary Education.

A. FOR STUDENTS SEEKING CERTIFICATION: A minimum of 24 hours of Education courses and a minimum of 12 hours in non-Education courses, as approved by the student's major professor, with a minimum of 36 hours required for the degree. Generally, the student will take his non-Education courses in the field of his undergraduate major.

Candidates for the Master of Arts in Teaching degree who have not completed the student teaching experience at the undergraduate level will be required to do so at the graduate level. These candidates should refer to the Undergraduate Catalog requirements and procedures for student teaching, and confer with the Director of Certification concerning individual program requirements.

B. FOR STUDENTS ALREADY CERTIFIED: A minimum of 18 hours of Education courses and a minimum of 15 hours of non-Education courses, as approved by the student's major professor.

In the event the student wishes to change his teaching field from his undergraduate major he will be required to meet the departmental prerequisites and teaching certification requirements. The student may prepare in more than one discipline if he is seeking a teaching endorsement in more than one field. Students may seek certification in any graduate area for which there is an undergraduate endorsement.

The Master of Arts in Teaching degree may be earned without the presentation of a thesis. No provision is made for thesis credit within the total hours required for the degree.

Students who wish to pursue the MASTER OF BUSINESS ADMINISTRATION degree or the MASTER OF SCIENCE degree (with a major in Accounting, Finance, Management, or Marketing) must have completed or complete satisfactorily the proper background courses. Except for the MASTER OF ARTS degree in Economics (see page 112) or the MASTER OF EDUCATION degree (major in Business Education and Office Management, see page 98), CORE I below lists the courses required for background. Students deficient in background courses must remove the CORE I deficiencies and any Departmental deficiency requirements. It is strongly recommended that such students make an appointment with the Director of Graduate Studies, College of Business Administration, for individual counseling.

CORE I

CREDITS

Fundamentals of Accounting	6
Principles of Economics	6
Basic Marketing	3
Business Finance	3
Business Statistics	6

Business Law	3
Organization and Management	3
Data Processing Systems	3
	<hr/>
TOTAL	33

If the prospective graduate student does not have an undergraduate degree in Business, but meets the entrance requirements for the graduate school given below, he may complete the required background courses with the 24 credits of the ALTERNATE CORE I:

ALTERNATE CORE I	CREDITS
Fundamentals of Accounting (7001)	3
Proseminar in Economics I (7010)	3
Basic Marketing (3010)	3
Business Finance (3410)	3
Survey of Statistical Methods in Business and Economics (7011)	3
Business and Its Environment (7001)	3
Advanced Organization and Management (7000)	3
Data Processing Systems (3750)	3
	<hr/>
TOTAL	24

Admission to a degree program is granted to graduates of accredited colleges and universities who show high promise of success in graduate business study. Criteria used for admission include the candidate's:

- Performance on the Admission Test for Graduate Study in Business (ATGSB);* (The test must be taken prior to admission to the graduate program.)
- Undergraduate grade averages and the trend of the grades during undergraduate work;
- rank in his collegiate graduating class;
- letters of reference and recommendation.

Arrangements for taking the ATGSB can be made by writing to ATGSB, Educational Testing Service, Princeton, New Jersey 08540. Packets are also available in the Graduate School Office at Memphis State University, and in the Director of Graduate Studies' Office, College of Business Administration, Memphis State University.

Qualified candidates may enter the program at the beginning of any semester. To assure proper evaluation, application credentials should be received at least 60 days prior to the beginning of the semester in which the candidate wishes to enroll.

*In the case of students whose native language is not English, performance on the Test of English as a Foreign Language (TOEFL) is required in addition to the ATGSB.

The Master of Business Administration program is specifically designed for students who have earned the Bachelor's Degree from Arts and Sciences, Engineering, Law, or other areas of study, as well as those who hold a Bachelor's Degree in Business Administration who desire to change their Area of Concentration. Students with adequate preparation in Business Administration and Economics may complete the program in a minimum of three semesters (one calendar year). A period of five semesters is normally required of students who have no undergraduate work in business. The graduate programs of the College of Business Administration are fully accredited by the American Association of Collegiate Schools of Business.

Each candidate for an M.B.A. degree must complete a minimum of 33 semester hours of course work and pass a written and/or oral examination. The 33 graduate credits comprising the M.B.A. program (Core II) are distributed as follows:

CORE II		CREDITS
<i>Required Courses</i>		
Economics 7020	Pro-Seminar II	3
Management 7420	Quantitative Methods for Business Decisions	3
Accounting 7010	Cases and Problems in Decision Making	3
FIR 7610	Analysis and Control of Business	3
Marketing 7012	Marketing Structure and Administration	3
Management 7410	Seminar and Business Policy	3
And one of the following:		
Marketing 7015	Research Methodology	3
Economics 7140	Business and Economic Research	3
Business Education 7530	Executive Communications	3
		<hr/>
		TOTAL 21
<i>Area of Concentration and Electives:</i> Courses in the areas of concentration are selected from the areas of graduate study listed above. These courses must be approved by the student's adviser.		12
		<hr/>
		CORE II TOTAL 33

A maximum of 15 semester credit hours may be taken in one area, and at least 24 of the 33 hours required must be in courses designated for graduate students (7000 level or above).

Master of Arts and Master of Science: The Master of Arts degree program is offered in the area of economics and Master of Science degree programs are available in accountancy, finance, market-

ing, and management. Descriptions of these programs are found in the appropriate departmental section.

The program for the MASTER OF EDUCATION degree is generally open to those who have completed the requirements for teacher certification. However, programs for non-certificated personnel are offered by the departments of Educational Administration and Supervision; Elementary Education (Reading); Guidance and Personnel Services; Health, Physical Education and Recreation; Secondary Education and Special Education and Rehabilitation. Departmental requirements with reference to thesis, research and course requirements are found on pages 80 to 249 of the Bulletin.

The Master of Education Degree is offered with the following majors:

(Areas of concentration within the major are in parentheses.)

M.Ed.—Adult Education

M.Ed.—Business Education and Office Management

M.Ed.—Distributive Education

M.Ed.—Educational Administration and Supervision (Superintendency)

Educational Administration and Supervision (General)

Educational Administration and Supervision (Elementary)

Educational Administration and Supervision (Secondary)

M.Ed.—Elementary Education

Elementary Education (Early Childhood)

M.Ed.—Guidance and Personnel Services (Elementary School Counseling and Guidance)

Guidance and Personnel Services (Secondary School Counseling and Guidance)

(Guidance and Personnel Services (General Counseling and Guidance)

M.Ed.—Health, Physical Education and Recreation (Health)

Health, Physical Education and Recreation (Physical Education)

Health, Physical Education and Recreation (Recreation)

M.Ed.—Library Service

M.Ed.—Reading

M.Ed.—Secondary Education

M.Ed.—Special Education and Rehabilitation (Mental Retardation)

Special Education and Rehabilitation (Learning Disabilities)

Special Education and Rehabilitation (Emotionally Disturbed)

Special Education and Rehabilitation (Deaf Education)

Special Education and Rehabilitation (Multihandicapped)

Special Education and Rehabilitation (Vocational Rehabilitation)

The program for the MASTER OF FINE ARTS in Theatre is generally open to students with considerable background in educational or professional theatre, and who intend to pursue careers in a production capacity in academic, community, regional, or professional theatres. Students will concentrate either in performance (directing and acting) or production (design and technical theatre). Specific requirements for admission and candidacy are specified on page 238 in the Bulletin.

The program for the MASTER OF MUSIC degree is generally open to students specializing in one of the following areas: Applied Music, Music Theory, Music History and Sacred Music. This degree is designed for those who have completed the Bachelor of Music degree in one of the above specified areas.

The program for the MASTER OF PUBLIC ADMINISTRATION degree is generally open to students with preparation in the social sciences or in business courses. Students working toward this interdisciplinary degree complete a core curriculum in public administration courses and a concentration in one of the following areas: General Public Administration, Urban Management and Planning, or Comparative and Development Administration.

The program for the MASTER OF SCIENCE degree is generally open to students with a science background. Departmental requirements with reference to thesis, language, and course requirements are outlined on pages 80 to 249 in the Bulletin. Those who are majoring in the following areas may seek the Master of Science degree: Biology, Chemistry, Civil Engineering, Electrical Engineering, Mechanical Engineering, Geography, Geology, Mathematics, Physics, Psychology, and Technical Education. Students majoring in Accountancy, Business Finance, Marketing, and Management may also apply for the Master of Science Degree Program.

The program for the MASTER OF SCIENCE IN TEACHING degree is designed to prepare students to assume a significant role in improving instruction at the secondary level in the natural sciences or mathematics. Those candidates who do not hold a teaching certificate may enroll in the program but will be required to qualify for certification before the degree is awarded. Courses may be in biology, chemistry, physical geography, geology, physics, and mathematics. A minimum of 33 semester hours is required with at least 21 semester hours in either (a) mathematics, or (b) combined natural sciences, and 9 to 12 hours in collateral areas. Under Option b, the nominal major may include a minimum of 9 semester hours in a particular science discipline (e.g. chemistry), 6 semester hours in a secondary science, (e.g. physics), and 3 semester hours in a third area of science. Any student who has not completed 6 semester hours in mathematics

above the equivalent of the freshman 1000 level is required to do so. If a student has completed the mathematics requirement, he may select one mathematics course of 3-4 semester hours at the 6000 or above level to count in his major. Specific requirements for any science, including any credits in a second and third science and a credit in non-science areas or education, may be determined by the departmental chairman or the major adviser.

For the collateral area in both options, students may take up to 9 semester hours in The College of Education and upon the approval of the major adviser, up to 9 semester hours in a non-science area.

Credit for a thesis is not allowed. Students may consult the departmental chairman concerning the specific details of the program.

General Requirements for Graduate Degrees.

Every graduate student and every prospective graduate student is expected to make himself thoroughly familiar with the regulations of The Graduate School and the requirements for degrees. Failure to follow the regulations and requirements usually results in complications for which The Graduate School cannot assume responsibility.

Master's Degree.

The Master's degree program shall include 30-33 semester hours of course work as follows. (Additional requirements for the Master of Fine Arts in Theatre can be found in the description of the program.) The student's program must be approved by the major department. In some cases, 18-24 semester hours are required in a major area and 8-12 semester hours in a collateral area.

A thesis of 3 to 6 semester hours may be presented as partial completion of degree requirements. If a thesis is presented, the student may be graduated with a total of 30 semester hours of which a minimum of 18 semester hours, exclusive of the thesis, shall be in the major field.

If a thesis is not submitted, the overall degree requirements shall be 33 semester hours, with a minimum of 21 semester hours in the major area.

All requirements for the degree must be completed within six years from date of the candidate's original registration for graduate course. Only under unusual circumstances can this requirement be waived, and then, only by the Dean of The Graduate School at the request of the major adviser.

At least 18 semester hours of the courses in a student's program must be of the type designated as primarily for graduate

students (7000 level courses). At least 12 semester hours of this must be done in the major. The department in which the collateral area is taken will determine whether or not any 7000 level courses are required.

Work done by graduate students registered for 6000 courses must be of a higher quality than that required of undergraduates. Also, the graduate student is required to do additional work. This may consist of independent study or of such other work as the instructor may demand.

Courses of 6000 level are offered as undergraduate courses with 4000 level numbers. A student may not receive credit for a 6000 level course if he has credit at the 4000 level. A student may not receive credit for 6000 level courses if he has not been fully admitted to The Graduate School.

Courses are numbered according to the following system:

4000-4999—Courses primarily for seniors and for which graduate credit is not offered

5000-5999—Courses offered in The Graduate School but open to seniors within 36 hours of graduation (degree credit not allowed (Must have 7000 level equivalent)

6000-6999—Senior courses open to graduate students. (Must have 4000 level equivalent)

7000-7999—Courses open only to graduate students

8000-8999—Courses open primarily to post-Master's students

Second Master's.

A student who holds a master's degree from Memphis State University may pursue a second master's degree if he is accepted by a department. No more than twelve (12) semester hours of the first degree may be applied toward the second degree. The department with which the student is studying will determine whether any credit from the former degree will be accepted toward the second degree. Any credit accepted toward the second degree must be within the regular time limit requirements for the master's degree.

Amount of Work Permitted.

Sixteen semester hours shall be the maximum load for students devoting full time to graduate study. Only full-time students may register for more than six semester hours of course work in any one semester, including courses on campus, extension courses, and courses to be transferred from other institutions.

Graduate students who are employed on a full-time basis may not register for more than six semester hours.

A student may register for 18 semester hours during his final academic semester for the purpose of graduating, if he has had a 3.5 average on previous graduate studies completed.

Certain residence courses, designated as "problems courses," or special individual research topics, are described in this bulletin. Seven semester hours of credit in problems or research courses may be applied to Master's degree requirements (4 to a major area or 4 to a collateral area) if the student has both a major and a collateral area. If the student does not have a collateral area, he may not apply more than 4 semester hours of special problems courses toward meeting degree requirements. Students are not allowed to register for more than one problems course in any one semester or full summer term.

Admission To Candidacy For The Master's Degree.

To become a candidate for a degree, the student must file an application on blanks available in the office of the Graduate Dean. The student must indicate on the application the degree program he is choosing. The application must contain plans for a complete program of graduate study and be approved by a faculty adviser in both the major and collateral areas and by the departmental chairman.

Before the "Application for Admission to Candidacy for the Master's Degree" can be approved and the applicant can be officially admitted to candidacy for a Master's degree, the student must have satisfied the following requirements:

1. The student must file an Application for Admission To Degree Candidacy immediately upon the completion of 12 semester hours of graduate work at Memphis State. The application must be approved prior to the semester in which the student plans to graduate. The summer session is considered as one semester.
2. The student must have completed prerequisite undergraduate requirements of not less than 18 semester hours in his graduate major area.
3. The student must have at least a "B" average on all graduate work preceding the date of the application for degree candidacy.
4. The general field of the student's thesis must have been approved after admission to candidacy has been established, if his program includes a thesis.
5. The student's graduate work up to this point must be acceptable in quality and quantity to his major adviser, departmental chairman and/or director of graduate studies.
6. The student's entire program must conform to the general regulations of The Graduate School and the requirements for his particular major.

Every student who files an "Application for Admission to Candidacy for the Master's Degree" will receive from the Grad-

uate Office an approved copy of the application or a letter explaining why approval has been withheld.

Audit Courses.

Students who are registered for one or more classes at Memphis State University may also register to audit a course with the approval of their adviser and the chairman of the department in which the course will be offered. Auditors are not to prepare lessons or papers, or take examinations. They are not to take part in class discussions or laboratory or field work.

Persons who are not enrolled for credit courses may register for audit courses with the approval of the Dean of Admissions and Records and the department chairman.

Students enrolled for credit courses may take no more than one audit course per semester. Persons who are not enrolled for credit courses may register for a maximum of three courses with the approval of the department chairman.

Fees for audits will be assessed on the same basis as fees for credit courses.

Credit for Work Completed Elsewhere and by Extension.

Credit earned at another institution must be presented for consideration at the time the student applies for degree candidacy. There is no automatic transfer of credit toward a graduate degree, but, in general, residence work completed at another accredited graduate school may be accepted for not more than six semester hours of course credit toward a Master's degree. No transfer of credit will be approved if the grade point average for graduate work attempted is less than three on a four point system. No credit will be transferred unless it meets with the approval of the major adviser.

Six semester hours of course work completed through the Memphis State University Extension Division may be applied toward degree requirements, provided it meets the approval of the major adviser. Six hours may be applied in the major area or three hours in the collateral and three hours in the major. Extension work taken with another institution is not transferable.

Graduate credit is never granted for courses taken by correspondence. No credit will be allowed toward specialist or doctoral degrees for correspondence courses, extension courses, or special short courses.

Grades.

The grades which may be awarded are as follows: A—B—C (the lowest grade for which graduate credit is allowed)—D—F, I (Incomplete), IP (In progress), and W (withdrawn).

The grades for research, student teaching, thesis, and dissertation courses shall be "U" or "S". Letter grades are given for special problems courses.

An average grade of "B" must be maintained in ALL graduate work, and credit earned with a "D" grade may not be counted toward meeting requirements for the Master's degree.

Grades earned at another institution may not be used to raise the cumulative grade point average at Memphis State University.

Work with a grade of "F" will be included in the grade average computation.

Not more than 7 semester hours of credit with a grade of "C" may be applied toward meeting degree requirements, and not more than 4 semester hours of "C" may be accepted in the major.

The grade of I (Incomplete) indicates that the student has not completed the course for some unavoidable reason that is acceptable to his instructor. Unless the student completes the requirements for removal of the "I" within 45 days from the end of the semester or summer term in which it was received, the "I" will be changed to an "F", regardless of whether or not the student is enrolled. Extensions may be granted if the instructor's absence from the campus makes it impossible for the student to remove the incomplete. Extensions must be approved by the Dean of the Graduate School.

Instructors of research courses shall be allowed to give a grade for "work in progress" (IP) to extend the time for the completion of such research. In the event this time extension is for longer than one calendar year, the responsible instructor shall present a written recommendation to the Office of the Dean of Admissions and to the Dean of The Graduate School for an official dropping of the course or for the assignment of a specific grade.

A student who fails to earn thesis credit at the end of one academic semester following the registration for the total thesis credits allowable will be required to renew his thesis status. In order that he remain in active status, the Master's degree candidate will be required to register for 3 semester hours of audit credit. This renewal of active status must be continued each academic semester until the thesis is completed. Registration in either term of summer school will fulfill the requirement for the summer. Credit will be posted upon completion and acceptance of the thesis, but no more than 6 hours will be allowed for a Master's thesis, even though the student may have been required to register for additional hours in order to remain in active status. The registration may be waived for any semester if the student's adviser is not available or for other reasons approved by the department chairman.

Retention.

A student who has a cumulative grade point average below 3.0 will be placed on probation. Continuation in graduate school must be approved by the Dean of The Graduate School. Any person whose continuation is denied may appeal the decision to the Executive Committee of the Graduate Council.

Comprehensive Examination for the Master's Degree.

Before being recommended for graduation, every candidate for the Master's degree is required to pass a final comprehensive examination in his major and in his collateral area; it may be oral or written or both, at the discretion of the departments concerned. A student will not be permitted to take the comprehensive examination before his Application for Degree Candidacy has been approved.

It is the student's responsibility to confer with his major and collateral area departments regarding the time and place of the examination. No reminders will be sent him by the Graduate Office.

Statement of Intention to Graduate.

Candidates for graduate degrees must file an "Intent to Graduate Card" with the Dean of the Graduate School prior to the beginning of the semester in which the academic requirements for the degree are to be completed. The degree to be earned shall be shown on the "Intent to Graduate" card which is available in the Graduate School Office. For this purpose the entire summer session is considered as one semester.

A student is not allowed to graduate in the last semester unless a "B" average is maintained for all semesters. Grades made the final semester are not allowed to average deficiencies. He will be permitted to graduate the subsequent semester.

In order to be eligible for graduation, a student shall have had his Application for Admission to Degree Candidacy approved prior to the beginning of the semester in which he plans to graduate. Master's degree candidates should file their Application for Degree Candidacy immediately upon the completion of twelve semester hours of graduate work.

Intermediate and doctoral degree candidates will file Applications for Degree Candidacy immediately after passing the departmental qualifying examination and being accepted into an advanced degree program. These applications are to be approved by the Dean prior to the applicant's final semester.

To facilitate communication, graduate students are expected to notify the Graduate Office of their changes of address. They should remember that all details connected with their work center in the Graduate Office.

Doctoral and Specialist Degrees.

Three Post-Master's degrees are offered by the Graduate School. These are the Education Specialist degree (Ed.S.), the Doctor of Education degree (Ed.D.), and the Doctor of Philosophy degree (Ph.D.). The Education Specialist degree is a one-year program beyond the Master's degree with the additional requirement of a thesis. The Ed.D. and Ph.D. programs require a minimum of two years beyond the Master's degree.

Education Specialist.

Students who wish to become candidates for the Education Specialist degree will observe all of the general post-master's requirements which are applicable.

The Education Specialist degree is available with a major in three areas: Educational Administration and Supervision, Personnel Services, and Curriculum and Instruction. The major in Educational Administration and Supervision is offered by the Department of Educational Administration and Supervision. The major in Personnel Services is offered by the Department of Guidance and Personnel Services. The major in Curriculum and Instruction is offered through the Departments of Elementary Education, Secondary Education, Foundations of Education and Special Education and Rehabilitation. For specific information concerning areas of concentration, course requirements, etc., students should review the program descriptions which are found under the departmental listings in this publication.

The following concentrations are available at the Ed.S. level:

Education Specialist Degree (Areas of Concentration within the major are in parentheses.)

Ed.S.—Curriculum and Instruction

Curriculum and Instruction (Elementary Education)

Curriculum and Instruction (Reading)

Curriculum and Instruction (Secondary Education)

Curriculum and Instruction (Higher Education)

Curriculum and Instruction (English Education)

Curriculum and Instruction (Foundations of Education)

Curriculum and Instruction (Music Education)

Curriculum and Instruction (Science Education)

Curriculum and Instruction (Business Education)*

Curriculum and Instruction (Social Studies Education)

Curriculum and Instruction (Mathematics Education)

Curriculum and Instruction (Special Education and Rehabilitation)

Ed.S.—Educational Administration and Supervision (Superintendency)

Educational Administration and Supervision (Elementary)

Educational Administration and Supervision (Secondary)

* Moratorium in effect as of catalog printing.

Educational Administration and Supervision (Higher Education)

Ed.S.—Personnel Services (Counseling and Guidance)

Doctor of Education.

The Doctor of Education degree is available with a major in three areas: Educational Administration and Supervision, Personnel Services, and Curriculum and Instruction. The major in Educational Administration and Supervision is offered by the Department of Educational Administration and Supervision. The major in Personnel Services is offered by the Department of Guidance and Personnel Services. The major in Curriculum and Instruction is offered through the Departments of Elementary Education, Secondary Education, Foundations of Education and Special Education and Rehabilitation. For specific information concerning areas of concentration, course requirements, etc., students should review the program descriptions which are found under the departmental listings in this publication.

The following concentration areas are available at the Ed.D. level: *Doctor of Education Degree (Areas of concentration within the major are in parentheses.)*

Ed.D.—Curriculum and Instruction

Curriculum and Instruction (Elementary Education)

Curriculum and Instruction (Reading)

Curriculum and Instruction (Secondary Education)

Curriculum and Instruction (Higher Education)

Curriculum and Instruction (English Education)

Curriculum and Instruction (Foundations of Education)

Curriculum and Instruction (Music Education)

Curriculum and Instruction (Science Education)

Curriculum and Instruction (Business Education)*

Curriculum and Instruction (Social Studies Education)

Curriculum and Instruction (Mathematics Education)

Curriculum and Instruction (Special Education and Rehabilitation)

Ed.D.—Educational Administration and Supervision

Educational Administration and Supervision (Higher Education)

Ed.D.—Personnel Services (Student Personnel Services)

To be eligible to receive the Doctor of Education degree, the student must have had a minimum of two years of acceptable experience in teaching or other appropriate educationally-related work. An approved internship may apply as a year of experience, but it may not satisfy more than half of the experience requirement. If the internship is to be used to meet a part of the experience requirement, it must have the recommendation of the department in which the student is pursuing a major.

* Moratorium in effect as of catalog printing.

Candidates for the Doctor of Education degree will take at least 21 hours of graduate work outside The College of Education. This collateral work may be chosen from any University department that has been approved to offer a major at the Master's level, provided the areas are appropriate to the student's objectives and are approved by the departmental graduate advisory committee.

Each student admitted to candidacy must register for the dissertation seminar, a course open only to doctoral candidates. Each student will be expected to develop a dissertation outline and present it as a part of the course requirements. Participants in the seminar for doctoral candidates will be graduate faculty members of The College of Education and departmental advisory committee members.

Doctor of Philosophy.

The Doctor of Philosophy degree is offered by the Departments of Biology, Chemistry, History, Mathematics, and Psychology. General requirements for the Ph.D. degree are outlined in the statements dealing with doctoral degrees. More detailed information about prerequisites, course work, research requirements, and degree programs can be obtained from the chairman of the respective department or Director of Graduate Studies. Any department may choose to admit a student to doctoral study without requiring the master's degree as a prerequisite.

Admission to Post-Master's Courses.

Students follow regular admission procedures to enroll for Post-Master's credit. Those who hold Master's degrees from accredited colleges or universities should attempt to present Graduate Record Examination scores prior to the initial registration (required by some departments). Students in the College of Education must present GRE scores (both aptitude phase and advanced test in education) prior to the completion of 12 hours of post-master's credit at Memphis State, if they plan to enroll in an advanced degree program. Any department may deny the student registration privilege if he lacks academic preparation, if he has inadequate grades, if he fails to present required test scores, or for other valid reasons. A student's initial enrollment in no way should be taken to mean that he has been accepted for degree candidacy. It is important that the student declare his intentions as soon as possible after his initial enrollment in order that candidacy status may be established. When the student is admitted to candidacy, his departmental graduate advisory committee will plan a complete program. Not until this time will the student's status be clearly defined.

Faculty members of the University will not be permitted to enroll in a degree program. They may enroll in a limited number

of courses for the purpose of transferring credits to another institution or they may enroll for personal improvement with approval of the department chairman and the Dean of The Graduate School.

Admission to Candidacy.

As soon as possible after the student has enrolled in course work, he should confer with his department adviser as to the department's policy concerning the completion of his application for degree candidacy. No student will be admitted to degree candidacy until the proper forms are approved by the departmental chairman or Director of Graduate Studies and the Graduate Dean and filed in the Office of the Dean of The Graduate School. Forms are available in the Graduate Office (Room 180, Administration Building Annex). Failure to discuss long-range degree plans with the departmental advisor and the Graduate Dean may result in misunderstandings and misconceptions on the part of the student.

Each person applying for candidacy will be required to take a qualifying examination administered by the department in which the student wishes to major. The examination may cover specialized knowledge and general knowledge; writing skill will also be considered. To be eligible to take the departmental qualifying examination, the student must have presented scores on the Graduate Record Examinations (aptitude and an advanced test) to the Graduate Dean. The test scores, transcripts and other pertinent data will be examined by a graduate departmental committee approved by the Graduate Dean. All students who are allowed to enroll for Post Master's courses are not necessarily eligible to take the departmental qualifying examination. Low scores on the Graduate Record Examination and/or an unsatisfactory grade-point average may prevent a student from taking the qualifying examination. All grades regardless of date earned are considered.

The student should seriously consider the implications of pursuing a doctoral program in an institution from which he has obtained all of his prior degrees.

Minimum Residence Requirements.

The minimum residence requirement for a doctorate is three full years of graduate study (72 semester hours) of which at least one academic year shall be spent at Memphis State University as a full-time student. The academic year consists of two consecutive semesters exclusive of the summer sessions. Attendance in the summer session may not be used to satisfy the residence requirements for the doctoral degree. The residence requirement in the College of Education must be completed after the student has been admitted to candidacy for the degree.

Candidates for the Ed.S. degree may satisfy residence requirements for the degree by attending Memphis State University

as a full-time student during one regular academic semester or by attending as a full-time student both terms of two summer sessions. The residence requirement in the College of Education must be completed after the student has been admitted to candidacy for the degree. The one year residence requirement for the Ed.D. may be completed only by registering as a full-time student for two regular academic semesters.

Research Requirements.

An acceptable dissertation is a requirement for all doctoral degrees. The dissertation must embody the results of an extended research effort which is an original contribution. It should reflect the candidate's ability to conduct independent research and interpret in a logical manner the facts and phenomena revealed by the research. The student will be required to meet the specific regulations of the department in which he is majoring.

Ed.S. degree candidates will present a six-hour field study of a significant problem in a local school system or a six-hour thesis based on research related to the graduate major. Ed.D. degree candidates will present dissertations for 12 hours of credit. Ph.D. degree candidates will present dissertations for 9-30 semester hours of credit depending on departmental policy.

A student who fails to earn dissertation credit at the end of one academic semester following the registration for the total credits allowable will be required to renew his dissertation status. In order that he remain in active status, the candidate will be required to register for 3 semester hours of dissertation credit. This renewal of active status must be continued each academic semester until the dissertation is completed. (The summer term will be considered an academic semester for this purpose.) Credit will be posted upon the completion and acceptance of the dissertation, but no more than 6 hours will be allowed for an Ed.S. thesis and no more than 12 hours for an Ed.D. dissertation, even though the student may have been required to register for additional hours in order to remain in active status. This requirement may be waived for any semester the adviser is not on the campus or for other reasons approved by the department chairman.

The candidate will be required to present to The Graduate School two copies of his dissertation to be bound. In addition, the student should provide a bound copy of his dissertation to both the chairman of his doctoral committee and the chairman of his Department. The dissertation, which will be microfilmed, must be accompanied by an abstract of not more than 600 words. The abstract will be published. Fees to cover the cost of microfilming and publishing are specified elsewhere and are to be paid by the student.

Time Limitation.

Credit earned more than ten years prior to the doctoral student's graduation cannot be applied toward meeting prerequisites or collateral requirements, unless approved by the student's departmental advisory committee, and the Executive Committee of the Graduate Council.

None of the last thirty-three semester hours of credit that is presented for fulfillment of the requirements for the Ed.S. shall have been earned more than six years prior to the student's date of graduation.

None of the last 66 hours of credit that is presented for fulfillment of the requirements for the Ed.D. shall have been earned more than 10 years prior to the student's date of graduation.

Course Load Limitations.

Full-time graduate students may enroll for a maximum of 16 semester hours. Those who register for 10 or more hours and devote a regular five-day week to study may be considered as full-time students. Graduate assistants who are responsible for the equivalent of two classes may register for no more than 9 semester hours; exceptions may be approved by the Graduate Dean upon the recommendation of the department. Students who are employed full-time may register for no more than 6 semester hours.

Acceptance of Credit Toward Degree Requirements.

Credit earned in another institution must be presented for consideration at the time the student applies for degree candidacy. Upon the approval of the student's department advisory committee, the credit will be transferred to apply toward the Ed.S., Ed.D., or Ph.D., provided that the credit meets general University requirements. Not more than one year of transfer work beyond the master's degree can be applied to requirements for the Ed.D. or Ph.D. degrees. Only six hours of transfer credit will be permitted for the Ed.S. degree.

Comprehensive and Final Examinations.

A comprehensive examination may be required by a department prior to approval of a dissertation topic. After the completion of the dissertation and all the prescribed work for the degree, the doctoral candidate will be given a final examination by a committee composed of departmental and University representatives. An announcement of the scheduled examination must be sent to the Dean of The Graduate School at least one month prior to the scheduled date. If the student's performance on this examination is satisfactory, he will have completed all requirements for the degree.

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Description of Courses

ACCOUNTANCY

PROFESSOR JAMES THOMAS THOMPSON, *Chairman*

Room 200, The College of Business Administration Building

In the Department of Accountancy, qualified students may work toward the M.S. degree with a major in accountancy, or the M.B.A. degree with an area of concentration in accountancy.

A. Prerequisites for M.B.A. and M.S. in accountancy:

In addition to Core I prerequisites, summarized on page 62, students should have successfully completed or complete Accounting 3110 and 3120, Intermediate Accounting I and II; Accounting 3310, Cost Accounting I; and Accounting 4510, Federal Income Tax I.

B. Each candidate for an M.S. Degree in Accountancy must complete a minimum of 33 semester hours and pass a written and/or oral examination. The 33 graduate credits comprising the M.S. in Accountancy include a minimum of 21 hours in the major (24 if a thesis is written). Accounting 7110, Accounting Theory I, Accounting 7120, Current Literature in Accounting, Accounting 7830, Techniques in Solving Accounting Problems, and Accounting 7010, Cases and Problems in Decision Making, are required in the major area. The remaining 9-12 hours are in collateral courses approved by the student's adviser.

At least 24 of the 33 credit hours required must be in courses designated primarily for graduate students (7000 level or above).

6220. Consolidated Financial Statements. (3).

Consolidations, mergers, foreign exchange. Spring semester. PREREQUISITE: Accounting 3120, Intermediate Acct. II.

6251. Readings in Auditing. (3).

Auditing theory, standards and procedures, case studies applicable to specific industries, current trends, study of American Institute of Certified Public Accountants releases pertaining to auditing. Spring semester. PREREQUISITE: Accounting 4240.

6520. Federal Income Tax II. (3).

Laws and regulations for corporations, estates, and fiduciaries. Spring semester. PREREQUISITE: Accounting 4510.

6540. Governmental Accounting. (3).

Accounting theory and practice applicable to federal, state, and local government; and to nonprofit institutions; budgetary control; classifications, control, and use of funds; financial statements and reports. Fall semester. PREREQUISITE: Acct. 2020, Fundamentals of Acct. II; and permission of instructor.

7001. Fundamentals of Accounting. (3).

An accelerated and in depth introduction to the conceptual foundations of accounting. The subject is presented as a dynamic information system for measuring and communicating economic and financial data for planning and control purposes. Primarily for non-business students but is acceptable to remove accounting prerequisites for the M.B.A. and M.S. programs in the College of Business Administration.

7010. Cases and Problems in Decision Making. (3).

Accounting analysis for decision making utilizing a case approach; budgeting; cost analysis, administrative accounting. Fall semester. PREREQUISITE: Accounting 2020, 3010 or 3310, or consent of department chairman.

7020. Accounting Applications of Electronic Data Processing. (3).

Planning and operation of electronic data processing systems in accounting; application of quantitative techniques to administrative decision making using accounting data generated by the computer; flow charting of financial and cost data movement; single and integrated electronic data processing systems in accounting. PREREQUISITE: Accounting 3120, Management 3750 or consent of department chairman.

7110. Accounting Theory I. (3).

A study of the broad aspects and objectives of accounting with emphasis on generally accepted accounting principles, modern accounting trends, and contemporary controversial topics, through a study of the current releases of the American Institute of Certified Public Accountants, the American Accounting Association, and other research related to changing accounting concepts. PREREQUISITE: Accounting 3120, 3310 or permission of the instructor.

7120. Current Literature in Accounting. (3).

A further study of the development of accounting theory and the influence of professional accounting societies and regulatory agencies upon the accounting profession. PREREQUISITE: Accounting 3120, 3310.

7240. Cases in Auditing. (3).

Review and refinement of generally accepted auditing standards, procedures and extension of auditing procedures; preparation of long form audit reports and study of special investigations; study of auditing research bulletins of the American Institute of Certified Public Accountants, and pronouncements of the S. E. C. and other regulatory agencies. PREREQUISITE: Accounting 3120, 3310, and 4240.

7310. Managerial Cost Analysis. (3).

Budgets, determination of standards, variances and their functions, cost reports, profit projecting, direct costing, gross profit and break-even analysis, cost-profit-volume analysis, capital expenditure control, comparative cost analysis. PREREQUISITE: Accounting 3310.

7510. Advanced Taxation. (3).

Selected research and study in the taxation of individuals and business organizations by Federal and state governments; preparation of selected state and Federal tax returns including those associated with income, excise, gift, death, sales, and payroll; tax practice and procedures. PREREQUISITE: Accounting 4520 or consent of department chairman.

7830. Techniques in Solving Current Accounting Problems. (3).

Review of C.P.A. Examination, including theory of accounts, accounting practice, and auditing. Spring semester. PREREQUISITE: Substantial accounting background and permission of instructor.

7910. Problems in Accounting. (1-3).

Directed independent reading and research projects in an area selected by the student with the approval of the staff member supervising. PREREQUISITE: Consent of the department chairman.

†7996. Thesis. (3-6).

Application for writing a thesis must be filled out on an approved form after consultation with the major professor and filed with the Dean of the Graduate School.

†Grades of S, U, or IP will be given.

ANTHROPOLOGY

ASSOCIATE PROFESSOR AUGUSTUS SORDINAS, *Acting Chairman*

Room 122, Clement Hall

The Department of Anthropology offers a collateral concentration area. Graduate students who select Anthropology as a concentration area of study will structure their program in consultation with their major adviser and the Chairman of Anthropology.

6065. Contemporary Anthropological Theory. (3).

Contemporary growth of theories and methods in anthropology. **PREREQUISITES:** Anthropology 1100, 1200, and 3065; or permission of instructor.

6250. Complex Societies. (3).

Folk society, peasant society, and the pre-industrial state. Community studies. Anthropological studies of social institutions and groupings in industrial settings. **PREREQUISITE:** Anthropology 1200 or permission of instructor.

6251. Comparative Social Structures. (3).

Comparative analysis of social structures and their functional relationships to other cultural institutions, with emphasis on family types, marriage patterns, and kinship. **PREREQUISITE:** Anthropology 1200 and at least one survey or area course in ethnology; or permission of instructor.

6252. Economic Anthropology. (3).

Comparative analysis of economic systems and their functional relationships to other cultural institutions; production, distribution, and consumption in non-literate groups; concepts of wealth, value, property, and ownership. **PREREQUISITE:** Anthropology 1200 and at least one survey or area course in ethnology; or permission of instructor.

6253. Anthropology of Religion.

Comparative analysis of religious systems and their functional relationships to other cultural institutions; inter-relations of myth, magic, and ritual; types of religious institutions and religious practitioners.

6254. Culture Change. (3).

Internal and external factors causing change in the small-scale society; theories of cultural evolution; social changes involved in the emergence of civilization; changes involved in industrialization.

6255. Political Anthropology. (3).

Comparative analysis of political systems and their functional relationships to other cultural institutions; formation and segmentation of political structures; requisites of leadership and political control.

6351. Evolution of Civilization. (3).

Comparative investigation of the origins of civilization in the Old and New Worlds. Development and study of models to explain the cultural, social, political, and other changes that lead to and define civilization. **PREREQUISITE:** Anthropology 1200 or permission of the instructor.

6411. Urban Anthropology. (3).

Anthropological studies of pre-industrial and industrial cities. Urbanization, movements of social transformation and other processes of adjustment to an urban milieu. Urban slums, ethnic ghettos, and housing developments in cross-cultural perspective. Urban kinship organization. Urban community development. Urban research techniques. PREREQUISITE: Anthropology 1200 or Sociology 1111, or permission of the instructor.

6742. Culture and Personality Change in Africa. (3).

The transformation of aboriginal African cultures; psychological correlates of social and cultural changes. PREREQUISITE: Anthropology 1200 or permission of instructor.

6751. Culture and Personality. (3).

Comparison of factors involved in the analysis of personality as contrasted to culture; the interaction of these factors; problems of studying personality cross-culturally.

6752. Applied Anthropology. (3).

Applications of anthropological knowledge and techniques to contemporary problems in government, industry, public health, and colonial and native administration. Emphasis on, but not limited to, contacts between industrial and non-industrial societies. PREREQUISITE: 12 semester hours of anthropology and permission of the instructor.

6975. Directed Individual Readings. (1-3).

Intensive guided survey of anthropological and related literature dealing with topics selected by advanced students and accepted by the staff. Compilation, synthesis, and evaluation of the published data; preparation for graduate level work, for students considering anthropology as a profession. Enrollment limited to anthropology majors and minors. PREREQUISITE: Permission of staff.

7231. Seminar in New World Ethnology. (3).

Intensive studies of selected cultural topics, utilizing data derived from ethnic groups of North and South America.

7242. Seminar in Old World Ethnology. (3).

Intensive studies of selected cultural topics, utilizing data derived from ethnic groups of Europe, Asia, and Africa.

7331. Seminar in New World Archeology. (3).

Intensive studies of selective cultural topics, utilizing data derived from prehistoric sites in North and South America. PREREQUISITE: Graduate standing.

7342. Seminar in Old World Archeology. (3).

Intensive studies of selected cultural topics, utilizing data derived from prehistoric sites in Europe, Asia, and Africa.

†Grades of S, U, or IP will be given.

AUDIOLOGY AND SPEECH PATHOLOGY

PROFESSOR ALAN J. WESTON, *Chairman*

Speech and Hearing Center, 807 Jefferson

Programs leading to the M.A. degree are offered with the major in Audiology or Speech Pathology. Each student will plan his program in consultation with his adviser. Students may pursue either a thesis or non-thesis program.

Thesis Program Minimum Requirements:

- a. 33 semester hours of graduate work, with 24-30 semester hours, exclusive of thesis, in the major area, and/or completion of academic and practicum requirements for the Certificate of Clinical Competence of the American Speech and Hearing Association.
- b. Completion of one hour of clinical experience (AUSP 7104 for Audiology majors and AUSP 7208 for Speech Pathology majors) in each semester of full time graduate study at this University. Students must complete a minimum of three semester hours of clinical practice with a grade of "B" or above within the time limit of six semesters, and must obtain a "B" or above in their last two semesters.
- c. completion of AUSP 7005, Introduction to Graduate Study.
- d. completion of thesis
- e. completion of oral comprehensive

Non-Thesis Program Minimum Requirements:

- a. the same requirements listed above will be met for non-thesis students, except that:
 1. AUSP 7990 (special projects) will be required in lieu of thesis, and
 2. written comprehensive examinations will be completed during the final semester of graduate study.

BASIC SCIENCE AREA

7000. Introduction to Phonetics. (3).

Analysis of the physiological positions and movements in the production of American English phonemes; understanding of the International Phonetic Alphabet as applied to American speech.

7001. Introduction to Hearing Science. (3).

Introduction to the measurements utilized in psychophysics and to physical structures of the hearing mechanism.

7002. Introduction to Speech Science. (3).

Study of normal speech and voice production with emphasis on respiratory and phonatory mechanism, speech acoustics, speech perception and control. Discussions and demonstrations describe basic instrumentation used to measure speech and voice parameters.

7003. Anatomy and Physiology of the Vocal Mechanism. (3).

Introduction to the study of the structure and function of the muscular systems related to speech production including respiratory, phonatory, and articulatory considerations. Selected laboratory experience.

7004. Anatomy and Physiology of the Hearing Mechanism. (3).

Study of the structures and functions of the human ear; principles of the hearing process.

7005. Introduction to Graduate Study. (3).

Students become acquainted with graduate studies through introduction to research applicable to Speech Pathology and Audiology and theories of measurement, including statistical and behavior designs, reliability and judgments, and replicability.

7006. Language and Speech Development. (3).

Study of the normal acquisition and maintenance of speech and language, theoretical formulations about language and speech behavior, and approaches to its study. Students observe and describe the language of children of various ages whose development is within normal range.

7007. Communicative Interaction. (3).

The study of concepts and processes fundamental to communicative interaction. Emphasis is given to application of such concepts and processes to the student's own communicative interactions.

7010. Neurological Bases of Communication. (3).

Study of the central nervous system and its role in the receptive and expressive aspects of normal speech and language. Consideration of CNS dysfunction resulting from brain injury, particularly as it pertains to speech and language.

7011. Psycholinguistics: Symbol Systems and Communicative Behavior. (3).

Study of linguistic structures of language, the nature and forms of symbolic behavior, and the human uses of symbols, particularly in communication.

7012. Seminar in Communication Theory. (3).

A survey of contemporary approaches to communication. The course examines semantic and linguistic theories, cybernetic and information theories, attitude formation and change, all based upon the concepts of experimental and philosophical design.

7013. Psychoacoustics. (3).

Investigation of psychoacoustical measurement and theories of hearing.

AUDIOLOGY

7100. Introduction to Audiology. (3).

An introduction to the study of audiology. Topics include: physics of sound, hearing loss, basic audiometric testing and hearing conservation.

7101. Audiological Concepts. (3).

Investigation of basic audiological concepts and their applicability to clinical procedures. Topics include: masking, bone conduction, speech reception and speech discrimination. PREREQUISITE: 7100.

7102. Seminar in Hearing Disorders. (3).

Investigation of the audiological effects of diseases and injuries of the hearing mechanism. PREREQUISITE: Permission.

7103. Differential Audiology. (3).

Consideration of special auditory tests involved in the differential diagnosis of hearing problems. Laboratory applications. PREREQUISITE: 7100.

7104. Clinical Experience in Audiology. (1).

Supervised clinical experience in the evaluation and/or management of clients with hearing impairments. Designed to meet student's individual needs. May be repeated for up to 6 hours.

7109. Medical Aspects of Audiology. (3).

A comprehensive introduction to acute and chronic hearing disorders traceable to disease and to their medical treatment. PREREQUISITE: Permission.

7111. Experimental Audiology. (3).

Study of experimental techniques; appreciation of research problems, procedures, and instrumentation culminating in completion of an independent research project.

7112. Seminar in Audiology. (3).

Detailed study of selected topics in audiology. PREREQUISITE: Permission.

7113. Industrial-Community and Military Audiology. (3).

Study of the requirements of audiology in the management, control, evaluation, and conservation of hearing problems in industry and the military.

7114. Amplification for the Hearing Impaired. (3).

A detailed study of the individual and his uses of amplification. Topics include: selection and operation of hearing aids, induction loop systems and group auditory trainers.

7115. Seminar in Child Audiology. (3).

Investigation of the audiological problems of children. PREREQUISITE: Permission.

7116. Early Childhood Intervention With Pre-School Deaf Children. (3).

Study of the language development of the deaf child with emphasis on pre-linguistic utterances, language comprehension and gesture language; effects of hearing impairment upon social, mental, and emotional development.

7122. Introduction to Aural Rehabilitation. (3).

Introduction to and analysis of principles and techniques used for children and adults with impaired hearing to develop listening and visual skills and to utilize residual hearing. PREREQUISITE: 7100.

7401. Therapeutic Communication in Speech Pathology and Audiology. (3).

A study of theory and practice of therapeutic communication with application to persons with communicative disorders. Application to various types of clinical situations are explored. Students have the opportunity to study their own clinical behavior with special reference to their communicative relationships.

7402. Organization and Administration of Clinical Programs. (3).

Exploration of administrative structures applicable to the variety and scope of clinical programs in Speech Pathology and Audiology. Emphasis is placed on possibilities for organizing, administering, and conducting such clinical programs, with special emphasis on those in schools.

7403. Seminar in Parent Counseling. (3).

Study of literature pertaining to parents of children with communication disorders, emphasizing therapeutic and/or educational approaches. Observation of the types of parent contact applicable to speech pathologists and audiologists. PREREQUISITE: 7007 or 7401.

7990. Special Projects/Independent Study. (3).

Geared to individual needs of students who wish to explore an area with faculty guidance. Students may pursue a pilot study. May be taken twice. PREREQUISITE: Permission of individual faculty member to be involved.

†7996. M.A. Thesis. (3).

SPEECH AND LANGUAGE PATHOLOGY

7200. Introduction to Speech Pathology. (3).

An overview of the field of Speech Pathology, including study of the various speech disorders and the roles of the speech pathologist in professional practice. Designed primarily for non-majors, or beginning graduate students.

7201. Seminar in Cleft Palate Habilitation. (3).

Study of cleft palate speech with emphasis on articulatory, resonance, and phonatory aspects as well as on medical and habilitative and rehabilitative principles.

7203. Seminar in Voice Disorders. (3).

In depth review of voice disorders by patterns of deviation, etiology, and techniques of intervention. Opportunity for original papers and/or projects.

7204. Seminar in Articulation. (3).

Study of current research in articulation, testing, prediction, and retraining procedures.

7205. Seminar in Stuttering. (3).

To review, critically evaluate, and synthesize information regarding the definition of stuttering, theories of etiology, symptomatology, therapy approaches, and methods of research.

7207. Differential Diagnosis of Speech and Language. Tests & Procedures. (3).

Principles and procedures for tests of language and speech dysfunctions; interpretation and rehabilitation plannings. PREREQUISITE: Permission.

7208. Clinical Experience in Speech and Language Disorders. (1).

Supervised clinical practice with clients. Designed to meet students' individual needs. May be repeated up to 6 hours.

7210. Seminar in Speech Pathology. (3).

Study of selected areas of speech or language disorders. May be repeated for up to 6 hours. PREREQUISITE: Permission.

7300. Language Disorders in Children. (3).

Study of the linguistic and neurological aspects of behavior relative to disorders of language in children. In depth review of etiology, assessment and treatment.

7302. Seminar in Aphasia. (3).

Study of the language behaviors associated with aphasia in adults with emphasis on etiologies, symptoms, rehabilitative procedures.

7304. Seminar: Research in Language Behavior and Disorders. (3).

Study of current experimental and clinical research of disorders of language. PREREQUISITE: Permission.

7305. Learning Disabilities. (3).

Critical study of the dysfunctions in the analysis and synthesis of sensory information including auditory, visual and haptic processing. Disturbances in symbolic operations are also discussed. Research, assessment and treatment of language and perceptual disorders with special application to the speech pathologist.

†Grades of S, U, or IP will be given.

7306. Laryngectomy. (3).

Study of literature and procedures for habilitative programs for laryngeal voice production. Emphasis on medical, psychological and physiological changes in the laryngectomized. Lecture and laboratory.

7401. Therapeutic Communication in Speech Pathology and Audiology. (3).

A study of theory and practice of therapeutic communication with application to persons with communicative disorders. Application to various types of clinical situations are explored. Students have the opportunity to study their own clinical behavior with special reference to their communicative relationships.

7402. Organization and Administration of Clinical Programs. (3).

Exploration of administrative structures applicable to the variety and scope of clinical programs in Speech Pathology and Audiology. Emphasis is placed on possibilities for organizing, administering, and conducting such clinical programs, with special emphasis on those in schools.

7403. Seminar in Parent Counseling. (3).

Study of literature pertaining to parents of children with communication disorders, emphasizing therapeutic and/or educational approaches. Observation of the types of parent contact applicable to speech pathologists and audiologists. PREREQUISITE: AUSP 7007 or 7401.

7990. Special Projects/Independent Study. (3).

Geared to individual needs of students who wish to explore an area with faculty guidance. Students may pursue a pilot study. May be taken twice. PREREQUISITE: Permission of individual faculty member to be involved.

†7996. M.A. Thesis. (3).

†Grades of S, U, or IP will be given.

BIOLOGY

PROFESSOR CARL DEE BROWN, *Chairman*

Room 103, Ellington Hall

Students selecting an advance degree with a major in Biology will select either Botany, Cell Biology, Invertebrate Zoology, Microbiology, or Vertebrate Zoology as the area of concentration.

Master's Degree (see general regulations of the Graduate School) Departmental requirements consist of:

- A. Biology 7000, 7200, 7600, and 7996 are required of all those who major in biology. Attendance in seminar is mandatory during each semester after which 12 hours have been accumulated with credit being earned in Biology 7200 in the penultimate semester of residence and credit for Biology 7600 during the last semester.
- B. Based on the 4 point system, a student must maintain a grade point average of 3.0. Continuation of a student who makes a C or below is at the discretion of the Student's Graduate Committee.
- C. A reading knowledge of one foreign language is required.
- D. Written examination, required of all graduate students; covering subject matter designated by advisory committee, will be administered once each semester and once during the first and second summer term on a date published by the department chairman.
- E. Presentation of research—7600 and a thesis—7996 as approved by the student's major professor.
- F. Final oral examination.

Biology may be used as a collateral area provided the student has the necessary undergraduate prerequisites.

When a student is enrolled in the MASTER OF SCIENCE IN TEACHING program, bona fide graduate credit will be given only in those courses which are open to all graduate students.

Ph.D. Degree (see general regulations of The Graduate School) Departmental requirements consist of:

- a. Course requirements—A minimum of three (3) academic years beyond the baccalaureate degree which represents no less than thirty-six (36) hours of course work excluding Research and Dissertation (Biology 9000). A minimum of thirty (30) semester hours beyond the master's degree must be taken in residence. Biology 7001 is required as well as active seminar participation.
- b. Admission—The prospective doctoral student must hold a master's degree from a recognized institution and will be required to submit scores of the Aptitude and Advanced Placement Test of the Graduate Record Examination with application to enter The Graduate School, or he must take the tests before completion of his first semester of graduate school.
- c. Foreign Languages—The prospective candidate shall be required to demonstrate a reading knowledge of two modern foreign languages. Those languages accepted without restriction are French, German, and Russian. The Graduate School, at the recommendation of the candidate's committee, may allow substitution of another foreign language when such substitution will enhance the research and scholarly interests of the student.

Substitution of statistics, computer techniques, or some other research tool in lieu of one of the modern foreign languages is at the discretion of the student's committee with the approval of The Graduate School.

Foreign students who utilize their native tongue to satisfy the language requirement as stated above must pass the English Proficiency Examination while registered at this institution.

- d. Preliminary Examination and Candidacy—After two years of course work the graduate student may take the written and/or oral preliminary examination in his major area. On the basis of the results of this examination, the student's committee shall make recommendation to admit or not to admit the student to candidacy. The committee will also determine the feasibility of the dissertation project at this time.

Admission to candidacy will be recommended to The Graduate School by the student's committee upon the satisfactory completion of the language requirements, the course work, completion of preliminary examinations and acceptance of the dissertation project.

- e. Dissertation and Research Prospectus—A dissertation will be required of all candidates for the doctorate. A minimum of eighteen (18) hours of research and dissertation credit must be scheduled during the graduate program. The dissertation must show a mastery of the techniques of scientific research, and it must be a distinct and new contribution to the body of scientific knowledge.

The student's committee must approve the topic, prospectus and the final dissertation.

- f. Final Examination—The final examination will be conducted by the chairman of the student's committee. The committee will consist, insofar as possible, of the same persons involved in the preliminary examinations. The examination will be in defense of the dissertation and may be written and/or oral as the committee sees fit. Upon successful completion of the examination, all degree requirements, the chairman and the committee will recommend awarding the Ph.D. by The Graduate School.

6030. Cellular Physiology. (4).

A study of the fundamental unit of all living things. The basic activities of cells are investigated—nutrition, adaption, growth and reproduction. PREREQUISITE: Biology 3070.

Two lecture, four laboratory hours per week.

6060. Limnology. (4).

Physical and chemical attributes of lakes, ponds and streams; organisms of fresh water; problems of production; laboratory work emphasizes Tennessee lakes, and practical training in limnological methods and identification of organisms. PREREQUISITE: Biology 1600, and one year of chemistry.

Two lecture, four laboratory hours per week.

6080. Radiation Biology. (3).

Effects of ionizing and excitational radiations upon life processes. PREREQUISITE: Chemistry 3312 or 3412 and Biology 3070.

Two lecture, two laboratory hours per week.

6100. Organic Development. (3).

The consideration of the theoretical and scientific evidences concerning the origin, development, and establishment of the major groups of living and extinct animals and plants. PREREQUISITE: One year of biology. Recommended for biology majors and general students as well.

6160. Histological Techniques. (4).

A study of the methods of preparing plant and animal materials for microscopic study; theories of staining and preparation of permanent mounts. PREREQUISITES: Biology 2000 or the equivalent or consent of instructor.

One lecture, six laboratory hours per week.

***6200. Marine Botany. (4).**

A survey, based upon local examples, of the principal groups of marine algae and maritime flowering plants, treating structure, reproduction, distribution, identification and ecology. PREREQUISITE: Ten hours of biology, including introductory botany, or consent of instructor.

6225. Mycology. (4).

A study of the basic life cycles, morphology and classification of fungi. Consideration of the interaction of fungal organisms in the environment. PREREQUISITE: Biology 2000 or the equivalent or consent of instructor.

Two lecture, four laboratory hours per week.

6226. Phycology. (4).

A systematic and comparative study of the morphology and reproduction of algae with emphasis on the fresh water forms. Selected topics on algal genetics, algal physiology and pollution will be included. PREREQUISITE: Biology 2000 or the equivalent or consent of the instructor.

Two lecture, four laboratory hours per week.

6231. Plant Physiology. (4).

A study of the principles of physiology and their application to the lower plant groups, exclusive of the bacteria and related forms. PREREQUISITE: 1200 or permission of the instructor.

Two lecture, four laboratory hours per week.

6232. Plant Physiology. (4).

A study of the principles of physiology and their application to the living organism as a whole, with emphasis on higher plants. PREREQUISITE: 1200 or permission of instructor.

Two lecture, four laboratory hours per week.

6240. Plant Taxonomy. (4).

A study of the principles of plant taxonomy. Special attention will be given to the classification of selected vascular plant families. Lectures, laboratory and field trips. PREREQUISITE: Biol 3240 or permission of instructor.

6250. Ecology of Forests and Arable Lands. (4).

Developmental and structural analysis of forest types from arable lands. Regional silviculture in the United States. Autecology of important species. Field trips to be arranged. PREREQUISITE: Biology 3050 or consent of instructor.

Three lecture, two laboratory hours per week (field trips to be arranged).

6440. Pathogenic Bacteriology. (4).

Methods of bacteriological technique, pure culture studies, and classification of bacteria. PREREQUISITE: Biology 3500, one year of introductory biology, one year of inorganic chemistry, with organic chemistry desirable.

Two lecture, four laboratory hours per week.

6444. Immunology. (4).

The lecture and laboratory sections of this course deal with antigens, antibodies and their reactions both *in vitro* and *in vivo*; hypersensitivities; blood groups, vaccines and immunity, *per se*. PREREQUISITE: Biology 3500 and Chemistry 3301.

6460. Sanitary Bacteriology. (4).

A study of micro-organisms in relation to water and sewage; disinfection and disinfectants. PREREQUISITE: Biology 3500 or consent of instructor.

Two lecture, four laboratory hours per week.

6560. Microbiology of Foods. (4).

Microorganisms in natural and processed foods; origins, nature and effects on foods, enumeration, and the relation to health. PREREQUISITE: Biology 3500 or consent of instructor.

Two lecture, four laboratory hours per week.

***6600. Marine Vertebrate Zoology and Ichthyology. (6).**

A general study of the marine Chordata, including lower groups and the mammals and birds, with most emphasis on the fish. PREREQUISITE: Twelve semester hours of biology.

6604. Ethology. (4).

A study of animal behavior with emphasis on recent developments in the field, including history of ethology, learning, releasers, communication, orientation, instinct, biological clocks, and evolution of behavior. PREREQUISITE: Biology 1600 or equivalent.

Two lecture, four laboratory hours per week.

6620. Vertebrate Histology. (4).

Microscopic study of normal tissues and organs of the vertebrate body. PREREQUISITE: Consent of instructor.

Two lecture, four laboratory hours per week.

6630. General Endocrinology. (3).

Anatomy and physiology of the organs of internal secretion; role of hormones in metabolism and development. PREREQUISITE: Biology 3730.

Three lecture-demonstration hours per week.

6640. Field Zoology. (4).

Designed to acquaint the student with a field knowledge of the animals of this locality. Identification, life history, and habitat will be considered. Birds and insects to be omitted. PREREQUISITE: Eight hours of biology including five hours of zoology.

Two lecture, four laboratory hours per week.

6644. Ichthyology. (4).

A study of fishes, with special emphasis upon the kinds which occur in Tennessee; collection, preservation and identification; life histories, management, and economic importance of fishes. PREREQUISITE: Biology 1600.

Two lecture, four laboratory hours per week.

6720. Comparative Neurology. (4).

A study of the nervous system of selected vertebrates. PREREQUISITE: Biology 1600 or equivalent.

Three lecture, two laboratory hours per week.

6740. Mammalogy. (4).

Classification, distribution, life histories, economic importance, techniques of field study, methods of collection and preservation of mammals. PREREQUISITE: Biology 3620.

Two lecture, four laboratory hours per week.

6744. Herpetology. (4).

Classification, distribution, life histories, techniques of collection and preservation, natural habitats of North American reptiles and amphibians. PREREQUISITE: Biology 1600 and 3620.

Two lecture, four laboratory hours per week.

***6800. Marine Invertebrate Zoology. (6).**

A general study of the anatomy, life histories, distributions, and phylogenetic relationships of all marine phyla below the chordates; for majors in zoology or geology. Laboratory and field work will be included. PREREQUISITE: Twelve semester hours of biology including general biology or zoology.

6840. Invertebrate Zoology. (4).

The invertebrate animals, exclusive of the insects. With special attention given to phylogeny, organology, and taxonomy. PREREQUISITE: Biology 1600 or consent of instructor.

Two lecture, four laboratory hours per week.

6920. Insect Morphology. (4).

A study of the form and structure of insects, considering both external and internal morphology. PREREQUISITE: Biology 1600 or the equivalent, or permission of instructor.

Two lecture, four laboratory hours per week.

6930. Insect Physiology. (4).

A study of physiology as applied to the life processes of insects. PREREQUISITE: Biology 2000 or the equivalent.

Two lecture, four laboratory hours per week.

6940. Aquatic Entomology. (4).

A survey of the orders of insects having aquatic and/or semiaquatic members with primary emphasis on their classification and with secondary emphasis on their biologies, habitats, etc. (A collection is required.) PREREQUISITE: Biology 3900 and 3940 or permission of the instructor.

Two lecture, four laboratory hours per week.

7000. Seminar in Biological Literature. (2).

Sources of literature in the field of biology and experience in the utilization of such sources in biological research. Class reports and term papers required. Required of all students as a prerequisite for writing a thesis.

7001. Unifying Principles of Biology. (4).

A study of the principles of biology from contributions of all major fields of science. Required as a basic course for all candidates for the doctoral degree as early in their program as possible. PREREQUISITE: Student must be pursuing a doctoral program in the department, or if a master's candidate, must have permission of the instructor.

7030. Cytology. (4).

Detailed studies of the functions and composition of individual cellular components, nuclear-cytoplasmic relationships, chromosomal variations and their genetic expression in plants. PREREQUISITE: Biology 1200 and 1600 or equivalent.

Three lecture, two laboratory hours per week.

7070. Cytogenetics. (4).

A discussion of current theories concerning the nature of the gene and the mechanisms of recombination and mutation. A detailed study of chromosome aberrations and their genetic behavior. PREREQUISITE: Biology 3070.

Two lecture, two laboratory hours per week.

†7091. Special Problems. (4).

Qualified students may be given special problems which they will investigate. The investigations will be pursued under the supervision of a member of the graduate staff and reported in the form of a written paper.

†7092. Research. (2-4).

The student through consultation, reading, and laboratory work will investigate selected topics in some phase of biology. A formal paper giving a review of the literature and the results of the investigation will be required.

***†7093. Problems in Zoology. (3-6).**

Supervised research on specific problems in marine zoology for graduates. PREREQUISITE: Zoology 6800 or 6600.

7100. Instrumentation. (2).

A consideration of recent developments in biological techniques which may be applied in the study of living organisms.

Two lecture hours per week.

7111. Statistics in Biology. (3).

A fundamental methods course in experimental statistics for biologists. Emphasis is placed upon calculation procedures appropriate to the biological interpretation of research measurements in their statistical context. The first semester considers the basic binomial and normal distributions and the Chi-square distribution for testing significance. PREREQUISITES: Mathematics 1112, 1212 or 2321.

Two lecture, two laboratory hours per week.

7112. Statistics in Biology. (3).

Continuation of Statistics in Biology 7111. This semester considers the T and F distributions for testing significance and for interval estimation, the basic experimental designs, the analysis of variance and simple linear regression. PREREQUISITES: Statistics in Biology 7111.

Two lecture, two laboratory hours per week.

†7200. Seminar in Biology. (1).

(Open to Biology majors only.) A consideration of selected topics in the biological sciences. Credit is earned when an approved topic is presented to the department prior to the final semester in residence.

7222. Advanced Morphology of the Flowering Plants. (4).

Studies in the origin, development, embryology and embryogeny, anatomy and vascularization of organs of flowering plants. Includes comparative studies of micro- and megasporogenesis and micro- and megagametophyte development, pollination and fertilization. Palynology is studied in light of its economic importance from the standpoint of anthropological and health studies. PREREQUISITE: Graduate standing. Biology 1200, 3221 or 3222 or consent of the instructor.

Two lecture, four laboratory hours per week.

7250. Advanced Plant Ecology. (4).

Considerations of plant distribution on a worldwide and a local basis with emphasis on the factors influencing plant distribution and growth. PREREQUISITES: Biology 3050 or consent of the instructor.

Two lecture, four laboratory hours per week.

7321. Advanced Mycology. (4).

Structure, classification, and life histories of selected groups of fungi, with investigations of genetics, phytopathogenicity, physiology, and reproduction. PREREQUISITE: Biology 3221 or consent of instructor.

Two lecture, four laboratory hours per week.

7330. Intermediary Plant Metabolism. (3).

A detailed study of the metabolism of carbohydrates, fats and nitrogen compounds in higher plants.

7331. Photosynthesis. (2).

Lectures and readings on modern theory of photosynthesis. Includes such topics as chloroplast structure and function; chemistry and photochemistry of chlorophyll; influence of external factors on rate of photosynthesis; absorption, fluorescence, and luminescence; energy storage; efficiency; carbon fixation; photosynthesis in cell extracts; phosphorylation. PREREQUISITE: Biology 1200, 6231, 6232, 7330.

7450. Microbial Ecology. (3).

A physiological and biochemical approach to microbial ecology employing techniques of microbiology and molecular biology as applied to ecological problems which affect the quality of our environment. PREREQUISITE: Biology 3500; Chemistry 3312 or consent of instructor.

7500. Virology. (4).

Introduction to the viruses. Principles of methodology concerning origin, development, classification, and propagation. PREREQUISITE: Biology 3500 and organic chemistry.

Three lecture, two laboratory hours per week.

7530. Bacterial Physiology. (4).

A survey of bacterial physiology including growth, nutrition, biosynthesis, and adaptation. PREREQUISITE: Bacteriology 3500, or its equivalent, and at least one year of chemistry.

Three lecture, two laboratory hours per week.

7560. Industrial Microbiology. (4).

A study of microbial transformations of industrial significance including fermentation, biodeterioration and biooxidation systems. PREREQUISITE: Biology 7530 or permission of the instructor.

Two lecture, four laboratory hours per week.

†7600. Seminar in Biology. (1).

A consideration of selected topics in the biological sciences. Credit is earned when the student presents the results of his thesis research. PREREQUISITE: Biology 7200.

7720. Mammalian Physiology. (5).

Advanced study of the morphological features of a representative mammal. PREREQUISITE: Biology 3620 or permission of instructor.

Two lecture, six laboratory hours per week.

7730. Mammalian Physiology (5).

A concentrated investigation of the functional activities of a typical mammal. PREREQUISITE: Biology 3730 and Biology 3620.

Two lecture, six laboratory hours per week.

7750. Animal Ecology. (4).

Relationships of animals to their environments with special emphasis upon population dynamics and ecological relationships at the population level. PREREQUISITE: Biology 3050 and 1600.

Two lecture, four laboratory hours per week.

7840. Protozoology. (4).

A survey of the free living and parasitic protozoa with consideration given to structure, taxonomy, habitat, and life history. PREREQUISITE: Five hours of zoology or its equivalent.

Two lecture, four laboratory hours per week.

7844. Advanced Parasitology. (4).

An advanced course in animal parasitology with emphasis on techniques and experimental approaches in parasitology. PREREQUISITE: Biology 3800 or consent of instructor.

Two lecture, four laboratory hours per week.

7848. Fresh-Water Invertebrate Zoology. (4).

A study of the life-histories, ecology, and classification of the fresh-water invertebrates exclusive of protozoans and insects. Techniques of collection and preservation are stressed in the preparation of a representative collection. PREREQUISITE: Biology 1600 or the equivalent, Biology 4840 or 6840.

Two lecture, four laboratory hours per week.

7920. Advanced Insect Morphology. (3).

Comparative studies of selected insect groups. PREREQUISITE: Biology 3920 or the equivalent.

One lecture, four laboratory hours per week.

7930. Advanced Insect Physiology. (3).

A detailed study of the physiology of various organ systems of insects. PREREQUISITE: Biology 3930 or the equivalent.

One lecture, four laboratory hours per week.

7940. Advanced Systematic Entomology. (4).

The principles of insect nomenclature with emphasis on procedures, rules, and the International Code will be included. Intensive study is made of specific insect groups. PREREQUISITE: Biology 3940, or its equivalent,

One lecture, six laboratory hours per week.

7941. Classification of Insect Larvae. (3).

A survey of the holometabolous orders of insects with primary emphasis on the classification of the larval stages of these insects, and with secondary emphasis stressing larval habitat, collecting larvae and techniques of rearing larvae. A student collection will be required. PREREQUISITE: Biology 3900 and 3940; 3930 strongly recommended.

One lecture, four laboratory hours per week.

7960. Applied Entomology. (4).

The identification, ecology, and distribution of special insect groups are studied. Principles and methods of chemical and biological control, mode of action of pesticides and their affect on the environment is included. PREREQUISITE: Biology 3940 or 3960, or permission of the instructor.

†7996. Thesis. (6).

All students majoring in Biology must write a thesis based on research done under the supervision of his major professor.

†9000. Doctoral Research and Dissertation. (1-10).

The dissertation must be an independent research project applying a mastery of the techniques of scientific research. It must be a distinct and new contribution to the body of scientific knowledge and be published or accepted for publication wholly or in part in a recognized journal acceptable to the student's committee. Minimum total of 18 hours is required.

*These courses are taught at the Gulf Coast Research Lab, Ocean Springs, Mississippi. Memphis State University residence credit is given through affiliation with the laboratory.

†Grades of S, U, or IP will be given.

BUSINESS EDUCATION AND OFFICE MANAGEMENT

PROFESSOR CHARLES EDWIN REIGEL, *Chairman*

Room 300A, The College of Business Administration Building

In the department of Business Education and Office Management, qualified graduate students may select from a minimum of 21 semester hours to a maximum of 33 semester hours from Area I, Business Education, and Area II, Office Management.

Area 1 (Minimum of 9 semester hours): Business Education 7610, 7620, 7630, 7640, 7650, 7655, 7670, 7680, 7710-18, 7720, 7910 or Distributive Education 7640. Area II (Minimum of 9 semester hours): Business Education 6400, 6401, 6410, 6660, 7420, 7530.

6400. Punched-Card Methods. (3).

Introductory course in the operation and use of punched-card equipment. Key punching, sorting, tabulation and preparation of reports, card designing and application to problems in the fields of economics, marketing, accounting, personnel, education, and other areas of research. Both semesters.

6401. Punched-Card Applications. (3).

An advanced course in the field of data processing. The course provides study in flow charting systems analysis, card layout, systems design and production work on unit record equipment. Both semesters. PREREQUISITE: Punched-Card Methods 4400 and Accounting 2020.

6410. Office Management. (3).

Modern methods used in office organization and management, scientific office management, office reports, office correspondence, calculating and checking, filing, records retention, duplicating, handling the mail, planning procedures, planning for equipment, office machines, automation, planning for office space, physical working conditions and office layout. Fall semester.

6660. Supervised Work Experience for Teachers of Vocational Business Subjects. (3).

Practical experience in relating theory and practice in the business laboratory surrounding the University and the metropolitan area of Memphis. A student enrolled in this course will be unable to take courses other than evening or Saturday courses because the major portion of his time will be devoted to the activities involved in employment in an actual business position. PREREQUISITE: Permission of instructor. Summers only.

**7420. Problems in Office Management. (3).
(Formerly Office Management II).**

Problems in actuating office employees and controlling the work of the office. Topics: Motivating Office Personnel; Job Evaluation; Recruiting and Training Office Employees; Office Supervision; Standards and Standardization; Quantity and Quality Control; Improving Procedures; Simplification; Office Forms; Measuring and Timing Office Work; Office Manuals; Office Costs and Budgets.

7530. Executive Communications. (3).

Methods and techniques of communication are critically examined through the writing of case problems in correspondence with emphasis placed upon principles and correct writing and in reports with importance placed upon the collection, analysis, organization, and presentation of authentic data. The course is primarily designed for the student who has had no basic study in either business correspondence or business report writing on the undergraduate level. (Fall and Summer).

7610. Principles, History, and Philosophy of Vocational Business Education. (3). (Formerly Principles and Philosophy of Vocational Education.)

History, principles, philosophy, and objectives of vocational business education. Special emphasis given to curricular problems in office education, contribution and relation to general education and to vocational education.

7620. Organization and Supervision of Vocational Business Education. (3). (Formerly Administration and Supervision of Vocational Education.)

Survey of office occupations programs with special emphasis on types of curriculums, production laboratories, and cooperative programs. Classroom supervision, physical layout, administration of programs, and utilization of block time.

7630. Improvement of Instruction in Secretarial Business Subjects. (3).

A critical evaluation of content, visual aids, methods and testing in type-writing, shorthand and secretarial and office practice courses.

7640. Improvement of Instruction in Bookkeeping and General Business Subjects. (3).

A critical evaluation of content, visual aids, methods, and testing in book-keeping and general business subjects.

7650. Teaching Office Practice, Office Machines, and Punched-Card Methods in High School. (3).

A study of content, methods and standards for courses in Office Practice in High Schools with special emphasis on the impact of automated Data Processing in the office.

7655. Materials and Methods in Vocational Office Education. (3).

A study of the instructional media and aids relating to vocational office education with emphasis on recent developments and research. Particular emphasis is placed on individual instruction techniques for the block-time approach to office education programs.

7660. Tests and Measurements in Business Education. (3).

Study of standardized and published tests in business education; exploration of the new trends in testing; application of sound testing theory and techniques to business education with special emphasis on evaluation of skill development, the establishment of realistic office competencies, and the involvement of grading standards.

7670. Seminar in Business Education. (3).

The purpose in this course is twofold: (a) to learn the methods and techniques of evaluating significant research studies and other current business education and related literature, and (b) to evaluate the progress that has been achieved in the conclusions of such literature to guide practical school use.

100 BUSINESS EDUCATION AND OFFICE MANAGEMENT

7680. Research and Thesis Preparation. (3).

This course is planned to offer the student practical experience in analyzing and solving typical problems in various fields of business. Emphasis is placed on research techniques, report procedures, and applied presentation. The material is selected and designed to give needed supplementary guidance during thesis writing and/or problem solving in important areas other than content. An individual formal research problem is mandatory when the course is not taken to complete the sequence of one in which definite research and presentation are required.

7710-18. Workshop in Business Education. (3).

A study of some phase of the business education curriculum through the media of group study; participants will have opportunity to work on content, methods, techniques, materials, and evaluative criteria.

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|---|---------------------------|
| 7710—Shorthand (3) | 7713—General Business (3) |
| 7711—Typewriting (3) | 7714—Bookkeeping (3) |
| 7712—Office Practice (3) | 7715—Evaluation (3) |
| 7716—Guidance (3) | |
| 7717—Supervision and Administration (3) | |
| 7718—Curriculum (3) | |

(Not more than 9 hours of workshop courses in Business Education can be applied toward a Master's Degree.)

7720. Guidance in Business Education. (3).

History, principles, and philosophy of guidance in business education; relationships of business teacher to school guidance services; special attention directed to the development, scope, and responsibilities for vocational guidance with respect to selection and retention of vocational students.

7910. Problems in Business Education. (1-6).

Directed independent research projects in an area selected by the student with the approval of the staff member supervising. PREREQUISITE: Approval of supervising teacher and departmental chairman.

†7996. Thesis. (3-6).

Application for writing a thesis must be filled out on an approved form after consultation with the major professor and filed with the Dean of The Graduate School.

†Grades of S, U, or IP will be given.

CHEMISTRY

PROFESSOR JOHN C. GUYON, *Chairman*

Room 210, J. M. Smith Hall

Graduate study in the Department of Chemistry is designed to develop a broad foundation of reasonable depth in chemistry as well as to emphasize original and authoritative research, making use of the most modern techniques and skills. Experience has shown that these goals can best be achieved by a combination of a limited number of formal courses, active participation in the research programs of senior scientists, and involvement in informal discussion groups as well as formal seminars. Only through a diverse program that meets the needs of the individual student can graduate training prepare students to assume roles of leadership in academic and industrial research, college and junior college teaching, and the interdisciplinary demands of industrial and government laboratories.

Areas of concentration for the master's and doctor's degree with a major in Chemistry are inorganic, analytical, organic, physical and biochemistry. Related courses may be taken in other departments including physics, mathematics, geology, and engineering and in fields other than the student's major within the Department of Chemistry.

Detailed information on the current research fields of members of the chemistry department faculty is given in a booklet available from the departmental office.

Graduate students who express an interest in going into the teaching profession are required, as a part of their professional training, to participate in the duties of the department as Teaching Assistants, the extent of this training to be determined by the Advisory Committees, the needs of the department, and the funds available.

Prospective students, in addition to meeting the requirements for admission to The Graduate School, are required to present as a prerequisite for admission a satisfactory record of undergraduate work in chemistry; normally 32 semester hours of chemistry will be required. Students who are deficient in undergraduate work may be admitted and the deficiencies removed without graduate credit. Candidates for admission are expected to have taken the Graduate Record Examinations so that their scores may be submitted along with their applications. Students who are unable to take this examination before entering will be required to do so at the first opportunity after enrolling.

6220. Instrumental Methods. (3).

Theory and application of the principles of electrometric, spectrometric, and chromatographic methods to the collection and interpretation of physical chemistry data; the applications of such methods to analysis; and a study of basic aspects of chemical instrumentation. Experimental techniques studied include advanced portions of electrochemistry; work in the UV, visible, IR, and NMR regions of the electromagnetic spectrum; gas chromatography; and instrument design. PREREQUISITE: Chemistry 3412.

Two lecture, six laboratory hours per week.

6511. Biochemistry. (4).

Chemistry of amino acids and proteins as related to their properties in biochemical systems. Enzymology, including kinetics and conformation studies. Coenzymes and their functions. The chemistry of carbohydrates, lipids and nucleotides. PREREQUISITE: Chemistry 3312.

Three lectures, two laboratory hours per week.

6512. Biochemistry. (4).

A continuation of Chemistry 6511. Metabolism of carbohydrates, amino acids and nucleotides. Biochemistry of DNA and RNA, including their relationship to the biosynthesis of proteins. Metabolic control. PREREQUISITE: Chemistry 6511.

Two lecture, four laboratory hours per week.

6900. Chemical Literature. (1).

Use of chemical literature and the writing of technical reports.

7060. Selected Topics in Chemistry. (3).

This course, designed for high school teachers, may include various topics illustrating the principles of modern chemistry and their applications in the areas of analytical, organic, and physical chemistry, and biochemistry as required by student demand. This course cannot be applied toward a major or minor in chemistry or physics. It may be repeated for a maximum of 12 hours credit. PREREQUISITE: Permission of instructor.

Three lecture hours per week.

7111. Systematic Inorganic Chemistry. (3).

Principles of wave mechanics, the hydrogen atom, electronic structure of the atom. Aufbau Principle, radiochemistry, oxidation—reduction, descriptive chemistry of the elements, and symmetry and point groups.

7112. Structural Inorganic Chemistry. (3).

A study of the physical methods for determining structure, character tables and group theory.

7113. Inorganic Preparations. (1-3).

An introduction to the laboratory techniques used in inorganic synthesis as illustrated by the preparation, purification, and characterization of inorganic compounds.

7114. Inorganic Reactions and Mechanisms. (3).

Crystal and ligand field theories, octahedral complexes, square planar complexes, stereochemistry, and reaction mechanisms.

7211. Systematic Analytical Chemistry. (3).

Discussions of classical and modern methods of analysis in terms of scope, applicability, and limitations. Included are method selection based on sample size and constitution, data evaluation, and current research in analytical methods.

7212. Radiochemical Methods of Analysis. (3).

An introductory course dealing principally with the interactions of radiation with matter, the detection of radiation, and chemical applications of tracers. Other subjects covered are nuclear structure, decay schemes, activation analysis, hot-atom chemistry, the Mossbauer Effect, and nuclear energy.

7213. Spectrochemical Methods of Analysis. (3).

A study of methods of analysis based on interactions of matter with electromagnetic radiation. Included are the methods based on the Beer-Lambert Law, ultra-violet, visible and infrared spectroscopy, as well as mass spectrometry, X-ray diffraction and fluorescence, and electron diffraction. PREREQUISITE: Permission of instructor.

7311. Organic Reaction Mechanisms. (3).

An introduction to the mechanistic categorization of the reactions of organic molecules. Consideration is given to the effect of reactant and transition state structure in ionic, radical, and isopolar reaction paths.

7312. Advanced Synthetic Organic Chemistry. (3).

Principles of the synthesis of complex organic molecules including monocyclic and polycyclic carbocycles and nitrogen and oxygen heterocycles. Also includes an introduction to the interpretation of spectral data in the structural assignment of reaction products.

7313. Physical Organic Chemistry. (3).

A detailed consideration of the qualitative and quantitative treatment of structure-reactivity relationships, including the effects of structural and medium variation. The correlation of structural properties and reactivity with variables derived from quantum chemical approximations is assessed. **PREREQUISITE:** Permission of instructor.

7320. Introduction to Nuclear Magnetic Resonance. (2)).

The course, consisting of one hour of lecture and three hours of laboratory per week, will provide the beginning graduate student with the fundamental concepts that form the basis of nuclear magnetic resonance. The laboratory will provide the practical experience necessary to enable the student to utilize nuclear magnetic resonance as a useful research tool. **PREREQUISITE:** Chemistry 3312 or Equivalent.

7330. Organic Preparations. (3).

An introduction to the laboratory techniques employed in organic synthesis as illustrated by the preparation, purification, and characterization of organic compounds.

7340. Introduction to Infrared Spectroscopy. (2).

The course, consisting of one hour of lecture and three hours of laboratory per week, will provide the beginning graduate student with the fundamental concepts of infrared spectroscopy. The laboratory will provide the practical experience necessary to enable the student to utilize infrared spectroscopy as a useful research tool. **PREREQUISITE:** Chemistry 3312 or Equivalent.

7411. Chemical Thermodynamics. (3).

Energy relationships and properties of ideal and nonideal systems primarily from the standpoint of classical thermodynamics.

7412. Chemical Kinetics. (3).

Theory of homogeneous reactions, theory of absolute rates, homogeneous, and heterogeneous catalysis, and mechanisms of reactions.

7413. Statistical Thermodynamics. (3).

A development of the fundamental principles of statistical thermodynamics and application to chemical systems. **PREREQUISITE:** Permission of instructor.

7414. Quantum Chemistry. (3).

Discussion of the Schrodinger equation, and its solution in simple cases, application of group theory and theory of molecular bonding. **PREREQUISITE:** Permission of instructor.

7511. General Biochemistry. (3).

A one-semester survey of the chemistry of compounds of interest in biochemistry systems and the major metabolic processes occurring in biological systems. **PREREQUISITE:** Chemistry 3412.

7512. Macromolecular Biochemistry. (3).

A discussion of the biosynthesis and function of proteins and nucleic acids.

7513. Experimental Methods in Biochemistry. (3).

An introduction to modern biochemical laboratory techniques including the isolation and characterization of nucleic acids, enzymes, and metabolites. The application of colorimetry, chromatography, centrifugation, electrophoresis, and radiosotope techniques will be discussed. PREREQUISITE: Permission of instructor.

†7910. Special Problems in Chemistry. (3-12).

Individual investigation and report under the guidance of the student's major adviser.

†7913. Chemistry Seminar. (1).

Formal meetings, presentation, and discussion of current topics of interest. Students, faculty and visiting scientists participate. Required of all regularly enrolled graduate students. May be repeated for a maximum of 3 credits.)

†8000. Research and Dissertation/Thesis. (1-6).

An original investigation undertaken with the supervision of a member of the graduate staff. The investigation will be the basis of a dissertation or thesis.

†8100. Special Topics in Inorganic Chemistry. (1-3).

Lectures and conferences covering selected areas of current interest in inorganic chemistry (including coordination compounds, ligand field theory, interstitial compounds, metal carbonyls, and physical methods of structure determination). (May be repeated for a maximum of 12 hours.) PREREQUISITE: Permission of instructor.

†8200. Special Topics in Analytical Chemistry. (1-3).

Lectures and conferences covering selected areas of current interest in analytical chemistry. Topics include equilibrium and titrimetric methods, electroanalytical methods, spectral methods, separation techniques, microanalysis, statistics and data analysis, radiochemical techniques, and electrode kinetics. (May be repeated for a maximum of 12 hours.) PREREQUISITE: Permission of instructor.

†8300. Special Topics in Organic Chemistry. (1-3).

Lectures and conferences covering selected areas of current interest in organic chemistry (including heterocyclic chemistry, organo-metallic compounds, alkaloids, steroids, terpenes, photochemistry, non-classical systems, biosynthesis, stereochemistry, carbohydrates, new synthetic methods, high polymer, and advanced physical-organic chemistry). (May be repeated for a maximum of 12 hours.) PREREQUISITE: Permission of instructor.

†8400. Special Topics in Physical Chemistry. (1-3).

Lectures and conferences covering selected areas of current interest in physical chemistry (including non-aqueous solutions, surface chemistry, X-ray crystallography, theoretical spectroscopy, nuclear structure, molecular structure of macromolecules, colloid chemistry and electro-chemistry). (May be repeated for a maximum of 12 hours.) PREREQUISITE: Permission of Instructor.

†8500. Special Topics in Biochemistry. (1-3).

Lectures and conferences covering selected areas of current interest in biochemistry (including general enzymology, protein chemistry, physical chemistry of biochemical macromolecules, lipid and carbohydrate metabolism, amino acid metabolism, nucleic acid chemistry, biochemical energetics, and metabolic regulation). (May be repeated for a maximum of 12 hours.) PREREQUISITE: Permission of instructor.

†8913. Chemistry Seminar. (1).

Formal presentations and discussions of current topics of interest. Faculty, graduate students and off-campus scientists participate. Required of all Ph.D. candidates.

†9000. Doctoral Research and Dissertation. (1-10).

An original investigation undertaken with the supervision of a member of the graduate staff. This investigation will be the basis of a doctoral dissertation and a contribution to the chemical literature. (Maximum amount of semester credits is 30.)

PHYSICAL SCIENCE

For the collateral area, 9 or 12 semester hours in courses approved by the Chairman of the department and the student's major professor.

6050. Glass Manipulation. (2).

A laboratory course in the fundamentals of glass manipulation and the construction and repair of simple laboratory apparatus.

Six laboratory hours per week.

6070. Physical Science for High School Teachers. (3).

A study of the fundamental principles of chemistry and physics as they relate to the understanding and teaching of these sciences in high school.

Three lecture hours per week.

6071. Physical Science for High School Teachers. (3).

A study of the fundamental principles of astronomy, meteorology, and geology as they relate to the understanding and teaching of these sciences in high school. PREREQUISITE: Chemistry 6070.

Three lecture hours per week.

†Grades of S, U, or IP will be given.

CIVIL ENGINEERING

PROFESSOR THOMAS S. FRY, *Chairman*

Room 104A, Engineering Building

The department of Civil Engineering offers a program leading to a Master of Science degree. Areas of concentrations within the graduate program in Civil Engineering include Environmental Engineering, Foundation Engineering, Structural Engineering, and Transportation Engineering.

6142. Unit Operations and Processes in Environmental Engineering. (3).

Operations and processes in water and waste treatment; including sedimentation, coagulation, neutralization, filtration, adsorption, biological treatments, softening and other techniques.

Three lecture hours per week.

6146. Environmental Engineering Analysis. (3).

Quantitative measurements and bench scale pilot plant studies in the fields of water, sewage, industrial waste and stream pollution. Interpretation and application of test data. PREREQUISITE: Civil 4145 or consent of instructor.

One lecture, six laboratory hours per week.

6147. Environmental Engineering Design. (3).

The design of a water and waste water treatment plant. The student's background as well as accepted design criteria will be utilized. PREREQUISITE: Senior standing or consent of instructor.

Two lecture hours/three laboratory hours per week.

6152. Applied Soil Mechanics. (3).

Applications of theory to practical design of building foundations; retaining walls, hydraulic structures and machine foundations.

Three lecture hours per week.

6164. Advanced Surveying. (3).

Elements of route location and design with emphasis on horizontal and vertical alignment, curvature, gradient and sight distance. PREREQUISITE: Civil Engineering 3111.

Two lecture, three laboratory hours per week.

7001. Engineering Analysis I. (3).

Review of mathematical methods for application to civil, electrical, and mechanical engineering; introduction to analog and digital computers.

Three lecture hours per week.

7002. Engineering Analysis II. (3).

Analysis of unsteady-state systems; lumped systems for digital computation; distributed systems for analog computation. PREREQUISITE: 7001.

Three lecture hours per week.

7012. Probabilistic Methods in Engineering. (3).

Uses of information Theory; Symbolic Logic, Bayes Theorem, Principle of Maximum Entropy, applied to problems in reliability, decision theory and engineering design with limited data. PREREQUISITE: Consent of instructor.

Three lecture hours per week.

7110. Advanced Structural Analysis. (3).

Analytical and energy methods for analysis of statically indeterminate structures. Selected numerical methods and digital computations.

Three lecture hours per week.

7111. Matrix Analysis of Structures. (3).

Matrix formulation of force and displacement methods. Code system in the displacement method and advanced programming techniques in digital computation.

Three lecture hours per week.

7112. Structural Dynamics. (3).

Free vibration of lumped and distributed systems. Normal modes and their use in finding response of structures to transient forces. Digital computation and analog simulation.

Three lecture hours per week.

7113. Advanced Reinforced Concrete. (3).

Behavior of reinforced concrete structures; ultimate strength designs. Prestressed concrete structures.

Three lecture hours per week.

7114. Advanced Steel Design. (3).

Plastic analysis and design of metal structures; application to multiple-story steel structures.

Three lecture hours per week.

7115. Plate and Shell Structures I. (3).

Analysis and design of cylindrical shell and folded plate structures; translation shell of double curvatures. Computer applications. PREREQUISITE: Consent of instructor.

Three lecture hours per week.

7116. Plate and Shell Structures II. (3).

Membrane and bending stresses of shells of revolution; design of domes and shell walls; buckling of shells. Computer applications. PREREQUISITE: Consent of instructor.

Three lecture hours per week.

7117. Finite Element Methods in Structural Mechanics. (3).

Structural idealization, stiffness properties of elements, structural analysis of element assemblage. Plane stress and strain problems. Applications to problems of plates and shells. Computer solution of large systems. PREREQUISITE: Consent of instructor.

Three lecture hours per week.

7131. Foundation Engineering. (3).

Critical study of foundation design of completed projects using case records; emphasis on failures and performance records.

Three lecture hours per week.

7132. Advanced Soil Mechanics. (3).

Basic theory and status of current research; applications to foundation problems.

Three lecture hours per week.

7133. Dynamics of Bases and Foundations. (3).

Design of foundations against impact and forced vibrations.

Three lecture hours per week.

7134. Flow Fluids Through Porous Media. (3).

Fluid seepage and underflow problems; filtration; groundwater flow.

Three lecture hours per week.

7144. Air Pollution Analysis and Control. (3).

A study of atmospheric emissions; sources, quantities, regulations, and control devices. PREREQUISITE: Consent of instructor.

Three lecture hours per week.

7145. Advanced Waste Water Treatment. (3).

Critical study of the theories of waste treatment using operating processes as examples; emphasis is on basic theory of solid and liquid waste treatment. PREREQUISITE: Civi 6146 or consent of instructor.

Three lecture hours per week.

7149. Water Resources Engineering. (4).

A review of the various aspects of water resources engineering with emphasis on application of principles of hydrology, engineering economy, water use and planning for single and multipurpose projects in water resource engineering. PREREQUISITE: Consent of instructor.

Three lecture hours per week.

7162. Transportation I. (3).

Highway and railroad engineering; planning and economics. Includes design, construction, operation, planning, economic feasibility, and financing. Emphasis will be placed on highway and railroad transportation as regional systems. PREREQUISITE: Approval of instructor.

Three lecture hours per week.

7163. Transportation II. (3).

The planning and design of air and water transportation facilities. Items include financing, traffic control, aircraft characteristics, demand, site location, runway configuration, terminal areas and other items affecting the comprehensive planning, design and operation of modern airports; and the characteristics of facilities, unique to water transportation. PREREQUISITE: Approval of instructor.

Three lecture hours per week.

7165. Geometric Design of Transportation Systems. (3).

Design of highways and streets with emphasis on capacity, intersections, channelization and parking facilities. PREREQUISITE: Civil Engineering 6164 or consent of instructor.

Three lecture hours per week.

7166. Design of Highway and Airport Pavements. (3).

Design practices, materials and testing of flexible and rigid pavements. PREREQUISITE: Consent of instructor.

Three lecture hours per week.

7991. Projects I. (3).

Independent investigation of a problem selected in consultation with instructor; report required.

Nine laboratory hours.

7992. Projects II. (3).

Independent investigation of a problem selected in consultation with instructor; report required.

Nine laboratory hours.

†7996. Thesis. (6).

†Grades of S, U, or IP will be given.

DISTRIBUTIVE EDUCATION

PROFESSOR C. EDWIN PEARSON, *Chairman*

Room 101, The College of Education Building

In the department of Distributive Education the prerequisites are: a Bachelor's degree, 9 hours in Marketing, Salesmanship, Retailing or Advertising; Distributive Education 3010; verified practical experience in a distributive occupation(s). In this major a minimum of 9 semester hours must be taken outside the College of Education.

Area I (Minimum of 9 hours) Distributive Education 6640, 6650, 7993; Management 6210, 6420; Marketing 7010, 7011, 7012, 7013.

Area II (Minimum of 9 hours) Distributive Education 6690, 6871, 7610, 7620, 7630, 7640, 7650, 7660, 7690, 7996, plus one elective (to make a total of 21 hours) selected from Area I, Area II, or from the following: Education 7303, GUID 7661, EDFD 7511, 7521; Marketing 7020, 7021, 7022, 7030.

For the collateral area, 9 to 12 hours are required as approved by the adviser.

The prefix used by The College of Education for courses in Distributive Education is DTED.

6640. Marketing for Distributive Education Teachers. (3).

A study of current marketing practices, marketing functions, merchandising, prices and competition. For extension classes only. PREREQUISITE: Permission of Distributive Education Department chairman.

6650. Retailing Principles for Distributive Education Teachers. (3).

A study of the organization, functions, and operation of retail businesses with emphasis on training needs and the implications for the distributive education teacher-coordinator. For extension classes only. PREREQUISITE: Permission of the Distributive Education Department chairman.

6690. Workshop in Distributive Education. (1-6).

Designed to meet the needs of inservice teachers by offering an opportunity to work cooperatively on problems which are real to teaching situations and which meet the needs of the individual. PREREQUISITES: Teaching experience and permission of director of the workshop.

6871. Student Teaching in Distributive Education. (3-9).

Observation of the operation of a high school distributive education program and of methods of teaching; participation in school activities, culminating in assuming responsibility for teaching and coordinating entire groups. PREREQUISITES: Distributive Education 3010, 4630.

7610. Principles and Philosophy of Vocational Education. (3).

The history, philosophy, principles and objectives of vocational education; curriculum problems; contribution of vocational education to general education; research problems and current vocational education literature.

7620. Administration and Supervision of Vocational Education. (3).

Designed for the vocational teacher or public school administrator desiring to accept responsibility for supervising vocational education programs at local, area or state levels. Includes study of program design; curriculum construction; classroom supervision; physical layout; administration of supplies, textbooks and equipment; state and federal legislation; accounting and reporting.

7630. Improvement in Instruction in Marketing, Merchandising, and Management. (3).

A critical evaluation of content, visual aids, methods and testing in marketing, merchandising, and management courses taught in high school and post-secondary distributive education programs.

7640. Techniques of Coordination in Vocational Education. (3).

Selecting training agencies; developing job analysis; selecting and briefing the training supervisor; selecting and working with advisory committees; utilizing other community resources.

7650. Problems in Distributive Education. (3).

A study of current trends and problems related to distributive education; viewpoints of leaders in the field; special attention to problems of students enrolled.

7660. Organizing and Teaching Adult Distributive Education. (3).

A study of the techniques of working with trade associations, employment services, Manpower programs, itinerant instructors and the unique features of planning, organizing, promoting, teaching and evaluating balanced continuing education programs for distributive occupations.

7670. Distributive Education in the Junior College. (3).

For teachers and administrators. A study of the objectives, nature and scope of post-secondary distributive education programs. Included will be suggestions for planning, developing, operating and evaluating programs in area vocational schools, technical institutes and junior colleges.

7680. Development and Supervision of Distributive Education Clubs of America. (3).

Aims and objectives of the Distributive Education Clubs of America and their value to the total Distributive Education field, emphasizing development, curricular integration, and evaluation of programs and activities. PREREQUISITES: Distributive Education 3010 and Distributive Education 4630.

7690. The Project Method in Distributive Education. (3).

The development, use and coordination of class, small group and individual vocational projects providing simulated occupational experiences for high school Distributive Education students. PREREQUISITES: Distributive Education 4630 and Distributive Education 5640.

7993. Work Experience in Distribution for Distributive Education Teachers. (1-3).

For graduate students needing recent practical experience in a distributive occupation. Students will be employed in cooperating businesses and assigned duties in sales production and in personnel training. The student will prepare a comprehensive written report of his practices, experience and problems and special investigations. PREREQUISITE: Teaching experience.

†7996. Thesis. (3-6).

†Grades of S, U, or IP will be given.

ECONOMICS

PROFESSOR KURT F. FLEXNER, *Chairman*

Room 400, The College of Business Administration Building

In the Department of Economics qualified graduate students may work toward the M.A. degree with a major in Economics or toward the M.B.A. degree with an area of concentration in Economics.

A. Requirements for the M.B.A. degree are summarized beginning on page 62.

B. Prerequisites for the M.A. degree in Economics:

Students should have successfully completed or complete Management 2711 and 3711, Statistics I and II; Economics 3310, Microeconomic Theory; Economics 3320, Macroeconomic Theory.

C. Requirements for the M.A. degree are a minimum of 21 semester hours (24 if a thesis is written) of approved course work in economics courses. The remaining 9-12 semester hours, with approval, may be taken in collateral courses. At least 24 of the 33 hours required must be in courses designated primarily for graduate students (7000 level or above). A comprehensive examination, written or oral, must be successfully passed. Proficiency in intermediate level theory and in degree course work will be expected.

6130. Government Regulation of Business. (3).

The several approaches to legal and legislative control of business—especially tax laws, commission regulation, and anti-monopoly legislation—are considered in view of the impact of each on industrial operating policy and corporate social responsibility. Both semesters.

6220. History and Theory of American Labor Movements. (3).

A study of major events and trends in American labor history from colonial times to the present, and of their relevance to evolving labor-management relationships. An analysis of alternative theories of American trade union development. Fall semester. PREREQUISITE: Econ. 3210.

6610. Central Banking and Monetary Management. (3).

A critical examination of the history and economic function of central banks. Analysis of the role of monetary policy in achieving predetermined objectives, with emphasis on the interrelationships of monetary policy, central banking, and the financial markets. Spring semester.

6810. Introduction to Economic Analysis. (3).

An introduction to the application of quantitative techniques of analysis to economic problems, including the identification of meaningful relationships, formulating usable quantitative statements about them, and developing relevant analytical methods for dealing with them. Fall semester.

6820. Introduction to Economic Analysis. (3).

A continuation of Economics 6810 with emphasis on the more complex and involved relationships of economic theory. Spring semester.

7010. Proseminar in Economics I. (3).

An introductory to intermediate level study of basic economic principles, concepts, and economic analysis, structured for graduate students not planning further study in economics. PREREQUISITE: Three or fewer hours of economics credit, graduate or undergraduate.

7020. Proseminar in Economics II. (3).

An intermediate to advanced study of microeconomic and macroeconomic analysis and literature. This course is designed for MBA candidates, for non-economics majors as a terminal course in economics, and for transfer students in economics and other economics majors with undergraduate hours deficiencies. PREREQUISITE: Six or more hours of economics, graduate or undergraduate. (Economic majors, permission of the department chairman.)

7110. Managerial Economics. (3).

A study of the economic rationale underlying key management decisions. Managerial problems are identified and examined in the light of relevant economic concepts, and action is determined on the basis of economic logic. Fall semester. PREREQUISITE: Econ. 3310 and 6810 or equivalent.

7120. Economic Fluctuations and Forecasting. (3).

The recent theory and history of the dynamics of economic activity, especially with reference to economic recessions and inflations, are surveyed. This is used as a basis of the analysis of the several methods of economic forecasting. Examples of each are examined.

7140. Business and Economic Research. (3).

A study of basic research techniques and their application to business and economic problems. Attention is given to both primary-source and secondary-source study approaches. A critical evaluation of selected sample studies is made. Spring semester. PREREQUISITE: Statistics and College Algebra.

7220. Seminar in Comparative Labor Movements. (3).

An analysis of the historical, ideological, and institutional background of labor movements representative of West European economies, Soviet bloc economies, and so-called "middle way" economies. Fall semester. PREREQUISITE: Econ. 3310 or 3210.

7310. Advanced Microeconomic Theory. (3).

An advanced, comprehensive consideration of the literature on demand theory, market organization theory, theory of the firm, wage theory, interest theory, and profit theory. Emphasis is on the usefulness of the theoretical formulations for analytical, research, and empirical study purposes. Fall semester. PREREQUISITE: Econ. 6810 or equivalent.

7320. Advanced Macroeconomic Theory. (3).

An advanced, comprehensive consideration of the Keynesian and post-Keynesian literature on consumption function theory, liquidity preference interest theory, marginal efficiency of capital theory, multiplier theory, and social model building theory. Emphasis is on the usefulness of aggregate concepts for analytical, research, and empirical study purposes. Spring semester. PREREQUISITE: Econ. 3320 and College Algebra.

7350. International Monetary Theory and Policy. (3).

A study of international capital movements, long term and short term, in terms of shifting trade flows and the changing world conditions that affect them. Attention is directed to the instruments and institutions of international investment as well as to their domestic economic and monetary impact. Spring semester.

7410. Foundations of Economic Thought I. (3).

A critical study of the earlier origins of economic thought, the emergence of classicism and the several dissident schools that appeared in the century and a half following the appearance of classicism. Fall semester.

7421. Foundations of Economic Thought II. (3).

An analytical study of the development of economic thought from the time of the appearance of the Marginalist in the latter part of the 19th century to the present time. Marshall, post Marshallian writers, Keynes, and Neo-Keynesian writers receive major attention. Spring semester.

7440. Seminar in Public Policy and Labor Relations. (3).

Research and discussion into public policy issues in labor-management relations. Attention is focused particularly on the evaluation and current status of the institutions, agencies, and techniques of government regulation. Spring semester. PREREQUISITE: Consent of the instructor.

7501. Location Theory. (3).

An analysis of general problems of the special structure of the economy, especially in terms of the location of industry, of the transportation network, and of resources utilization. Emphasis on a theoretical framework that will be useful in later studies in regional and urban economics and in international trade theory. Spring semester. PREREQUISITE: Econ. 3310 (Microeconomics).

7510. Theory of Economic Growth and Development. (3).

A consideration of the economic variables involved in economic growth and of the functional relationships that may be of significance, from the point of view both of the underdeveloped economy and of the mature society. The more important theoretical growth models—Hicks, Harrod, Domar, Dussenberry, Goodwin, Kaldor, Solow—will be carefully analyzed and evaluated. Fall semester. PREREQUISITE: Econ. 3320 (Microeconomics).

7511. Economics of Transportation. (3).

An analytical and critical survey of selected problems in the development of a transportation system. Included are analyses of the principal economic problems which arise with the development and regulation of railroads and other modes of transportation.

7520. Regional and Urban Developmental Economics. (3).

A study of economic growth with the region as the economic development unit. Basic techniques such as regional social income accounting, regional balance of payments analysis, industry location study, economic base analysis, and regional input-output studies are examined. Spring semester. PREREQUISITE: Economics 3320 (Macroeconomics).

7611. Monetary Theory and Policy. (3).

A survey of monetary theory with particular emphasis on the current controversies in the field and their implications for policy. Recent contributions are carefully examined and evaluated. PREREQUISITE: Economics 3320 or equivalent.

7620. Fiscal Theory and Policy. (3).

A survey of the theory relating to the use of government taxing, spending and borrowing powers to affect the level of national income. Recent thought is carefully examined and evaluated and particular emphasis is given the current controversies relating to policy implications.

7720. Advanced Public Finance. (3).

The course emphasizes (1) the production of public goods (2) financing of public goods and (3) problems created by a federal fiscal system. Current problems and policy decision will be used. Public finance theory and policy will be analyzed.

7750. Seminar in State and Local Finance. (3).

A seminar dealing in state and local finance which deals with an analyses of taxation and public expenditures and the fiscal relationship of inter-governmental units. PREREQUISITE: Economics 7720.

7810. Econometrics I. (3).

A review of the quantitative methodology necessary for understanding and using econometric models. An introduction to the basic concepts of econometrics, with more simple models conceptualized and computed as a means of illustrating econometric technique. Fall semester. PREREQUISITE: Econ. 6810 or equivalent.

7820. Econometrics II. (3).

An examination of the basic theory of the stochastic variable and its relationship to the econometric model. A study of how the simple model can be expanded to become a useful forecasting and analytical device. Spring semester. PREREQUISITE: Econometrics I.

7910. Problems in Economics. (1-6).

Directed independent reading and research in an area selected by the student with the approval of the staff member supervising. PREREQUISITE: Consent of the Department Chairman.

7930-1-2. Seminar in Economics. (3).

A general problem area, current in economics, is selected. Individual studies in this area are then pursued with group analysis, discussion, and evaluation at regular meetings. Emphasis is on research technique. Fall semester. PREREQUISITE: Consent of the instructor. May be repeated for credit.

†7996. Thesis. (3-6).

Application for writing a thesis must be filled out on an approved form after consultation with the major professor, and filed with the Dean of The Graduate School. Independent research for the master's degree.

8120. Seminar in Economic Forecasting. (3).

After a careful examination of the literature of general and regional forecasting, the student is required to prepare several comprehensive, specific forecasts. These are presented to and defended before the class. Spring semester. PREREQUISITE: Econ. 6120 and one year of Statistics.

8410. Seminar in Economic Thought. (3).

Individual studies in economic thought are pursued. The student is required to select one of the more recent economic thought systems—Marxism, Neoclassicism, Institutionalism, Keynesionism, Neo-Keynesianism—for intensive study and critical analysis. Spring semester. PREREQUISITE: Econ. 7310, 7320 and Econ. 6410 or 7421.

†Grades of S, U, or IP will be given.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

PROFESSOR FRANK W. MARKUS, *Chairman*

Room 406, The College of Education Building

In the Department of Educational Administration and Supervision students may select from several programs as follows:

- A. Master of Education — Educational Administration and Supervision (Superintendency) — Requirements: EDAS 7000, 7120, 7140, 7210 or 7220, EDFD 7521, EDUC 7401, *9 semester hours outside the College of Education and one course selected from any supporting area. Minimum total: 33 semester hours.
- B. Master of Education — Educational Administration and Supervision (Elementary) — Requirements: EDAS 7000, 7100, 7110, 7220, one other course from departmental offerings, EDFD 7521, EDUC 7401, *9 semester hours outside the College of Education and one course selected from any supporting area. Minimum total: 33 semester hours.
- C. Master of Education — Educational Administration and Supervision (Secondary) — Requirements: EDAS 7000, 7100, 7150, 7210, one other course from departmental offerings, EDFD 7521, EDUC 7401, *9 semester hours outside the College of Education and one course selected from any supporting area. Minimum total: 33 semester hours.
- D. Master of Education — **Educational Administration and supervision (General) — Candidates for this degree must meet the following prerequisites: a minimum of 6 semester hours in upper division undergraduate or graduate work in psychological, sociological, philosophical or historical foundations. The program is available to non-certificated personnel only. Requirements: Administration 3 semester hours, Supervision 3 semester hours, Research 3 semester hours, 12 semester hours selected from departmental offerings, *9 semester hours selected from offerings outside the College of Education and 3 semester hours selected from any supporting area. Minimum total: 33 semester hours, excluding prerequisites.
- E. Master of Education — Adult Education (See p. 122).
- F. Education Specialist — Educational Administration and Supervision (Superintendency), (Elementary), (Secondary); or **(Higher Education) — Requirements: 30 semester hours in the major concentration, 12 semester hours of collateral work in the College of Education, EDFD 7521, 7541, 3 additional semester hours in Foundations of Education and ***15 semester hours outside the College of Education including courses from the social sciences, behavioral sciences and political sciences. Additional information pertaining to specific course requirements in the major and collateral areas may be secured from the Department of Educational Administration and Supervision. Minimum total: 66 semester hours of graduate credit with a minimum of 9 semester hours selected from courses numbered 8000 or above.
- G. Doctor of Education — Educational Administration and Supervision or Educational Administration and Supervision *(Higher Education) — Requirements: 48 semester hours in the major concentration, 15 semester hours of collateral work in the College of Education, EDUC 8950, EDFD 7521, 7541, and 8521 or 8542, 3 additional semester hours in Foundations of Education and ****21 semester hours outside the College of Education including courses from the social sciences, political sciences, behavioral sciences, and business administration. Additional information pertaining to specific course requirements in the major and collateral areas may be secured from the Department of Educational Administration and Supervision. Minimum total: 99 semester hours of graduate credit with a minimum of 21 semester hours selected from courses numbered 8000 or above.

*If the course work for the student's teaching endorsement area (Home Economics, Physical Education, etc.) is offered in the College of Education, the 9 hours may be taken within the College.

**NCATE does not accredit programs for non-certificated personnel nor programs in higher education.

***If the course work for the student's teaching endorsement area (Home Economics, Physical Education, etc.) is offered in the College of Education, 9 semester hours may be taken within the College. A minimum of 6 semester hours must be taken in an area of the social sciences, behavioral sciences or political sciences.

****A minimum of 9 of the 21 hours must be taken in one area of the social sciences, political sciences, behavioral sciences, or business administration. If the course work for the student's teaching endorsement area (Home Economics, Physical Education, etc.) is offered in the College of Education, 12 semester hours may be taken within the College.

EDUCATIONAL ADMINISTRATION AND SUPERVISION (EDAS)

7000. School and Community Relationships. (3). (EDAS 6400)

The relationship of the school to the community movements and organizations concerned with health and safety, government and civic life, religion, occupations, extension services, children's organizations and clubs, adult education, cultural education, community cooperative movements, etc.; relationships of the community to such school activities as attendance, athletics, lunch, libraries, extracurricular program, home study, records and reports, guidance, etc.

7100. Public School Organization and Administration. (3).

The following will be studied: the administrator and his leadership; his relation to all agents and agencies of the school; types of school organization, administrative and instructional supervision; classification and promotion of pupils; curriculum activities and materials; public relations; office administration, plant operation, assemblies, extra-instructional activities; special classes, library, and health program.

7110. Elementary School Administration. (3). (EDAS 6110)

A study of the major aims of the elementary school; planning the daily program through the integration of related subjects; learning to keep and interpret various types of records and reports. Considering the importance of proper teacher-parent relationships. Special emphasis on the P. T. A. program in Tennessee.

7120. School Finance. (3).

The theory and practice of financing public education in the United States, development of guiding principles of educational finance, trends and needs in state and federal participation in school support, and local operational finance; particular attention to the financing of the public schools of Tennessee.

7130. School Business Administration. (3).

The role of business administration in public education; principles and practices of auditing, budget preparation and control, debt service, insurance, legal aspects, payroll administration, purchasing, supply management and transportation.

7140. School Plant. (3).

A consideration of the school plant grounds, and major equipment in relation to the educational needs of the community; factors in site selection, procedures in planning school buildings, principles of design and construction, architectural and contractual services and maintenance.

7150. High School Administration. (3).

This course is offered as a concise description of modern useful practices in organizing and administering secondary schools, types of high schools, selection and assignment of staff, program of studies, records, management of buildings and grounds, pupil personnel guidance, selection, retention and improvement of teachers, and interpreting the school to the public.

7160. Administration of School Personnel. (3).

This course is designed to deal with the various aspects of school personnel management. Qualification, selection, pay schedules, and general personnel policies dealing with retirement, sick leave, insurance, and other such problems will be considered. Attention will be given to the efficient use of administrative, instructional and non-instructional personnel.

7170. Internship in School Administration. (3).

This course is designed to provide practical experience to students of school administration. The student will have opportunity to observe and participate as an administrative intern in selected school systems. The areas of observation and participation will include administration, supervision, school-community relationship, finance, and plant and transportation at secondary and/or elementary levels. (Prospective enrollees should give thirty days notice of intention and secure approval of the chairman of the department.)

7171. Internship in School Administration. (3).

This course is designed to provide practical experience for students of school administration. The student will have opportunity to observe and participate as an administrative intern in selected school systems. The areas of observation and participation will include administration, supervision, school-community relationships, finance, and plant management. (Prospective enrollees should give thirty days notice of intention and secure approval of the chairman of the department.)

7172. Practicum: Administration of Higher Education. (3).

This course is designed to provide practical experience for students interested in administrative positions in higher education. The student will have opportunity to observe and participate as an administrative intern in selected junior colleges. The areas of observation and participation will include administration, records and admissions, student personnel services, plant planning and management, community services, and research. (Prospective enrollees should give thirty days notice of intention and secure approval of the chairman of the department.)

7173. Practicum: Administration of Higher Education. (3).

This course is designed to provide practical experience for students interested in administrative positions in higher education. The student will have opportunity to observe and participate as an administrative intern in selected colleges. The areas of observation and participation will include administration, records and admissions, student personnel services, plant planning and management, community services, and research. (Prospective enrollees should give thirty days notice of intention and secure approval of the chairman of the department.)

7180. School Law. (3).

This course is designed to consider the Federal and State statutes and local regulations which are applicable to the field of education. Emphasis is placed on legal requirements and their implications for public school operation. Court decisions relating to public schools are considered. The course is for administrators and students of administrative procedures.

7200. City and County School Supervision. (3).

A course designed to consider the general supervisory functions and techniques in school systems. The purpose of the course is to help the administrator and supervisor evaluate present programs and practices and from the evaluations plan in-service-training experiences which lead to improved instruction.

7210. High School Supervision. (3).

This course is designed to investigate some of the modern theories, principles and practices of school supervision as they apply to the practical problems of supervision at the secondary school level. Qualifications, selection and performance of supervisors are considered, along with the functional demands on modern secondary schools.

7220. Elementary School Supervision. (3).

This course deals with significant supervisory problems at the elementary school level. Recent research findings will be used to focus on the problems as they are dealt with through democratic elementary school supervision.

7410. Human Relations in School Administration. (3).

The course will emphasize human relations in successful educational leadership positions. Human relations principles will be applied to the various responsibilities of school leaders, and research findings in this field will be interpreted for successful practices in school administration. Investigation of the practices and concepts of school leadership will be designed to help the student develop a personal philosophy which will be of practical benefit in his position.

7500. Contemporary Issues in Educational Leadership. (3).

Seminar on contemporary issues confronting leaders in American education currently before the profession and the public. The role of the administrator in resolving contemporary issues.

7510. Seminar in Educational Leadership. (1-6).

This course is designed primarily for persons in positions of educational leadership. It will deal with problems and issues deriving from movements and trends in our present day culture. Emphasis will be given to educational leadership arising therefrom.

7700. Special Problems in School and Community Relationships. (1 to 3).

Individual investigations and reports of specific problems.

7710. Special Problems in School Supervision. (1 to 3).

Individual investigations and reports of specific problems.

7720. Special Problems in School Plant and Transportation. (1 to 3).

Individual investigations and reports of specific problems.

7730. Special Problems in School Finance and Business Management. (1 to 3).

7750. Special Problems in School Law. (1 to 3).

Individual investigations and reports of specific problems.

7760. Special Problems in Educational Research. (3.)

Individual investigations of public school surveys, with a critical study of current practices, trends, and objectives.

†7996. Thesis. (3-6).

Only students with superior scholarship are permitted to register in this course. The students must present in writing an outline describing the proposed thesis. This outline, when approved by the faculty members under whose direction the thesis is to be written, must be submitted to the Chairman of the Department of Educational Administration and Supervision for his approval. This course will involve writing the thesis and will emphasize the adequate setup of the problem, the collection of the data, their use, and conclusions to be reached. Application for writing a thesis must be filled out on an approved form, after consultation with the major professor and filed with the Dean of The Graduate School at the time of registration.

†8000. Educational Specialist Thesis. (3-6).

(See course 7996 description)

†8001. Education Specialist Field Study. (3-6).

Individual study of a significant problem in a local school system. The study shall be closely related to the student's field of major concentration.

8100. Theories and Practices of Educational Administration. (3).

The study will be concerned with the basic theories of the organization and administration of public education; philosophical and historical foundations of theories; historical development of theories in current practices; and exploration of possible future administrative theories. PREREQUISITE: Education 7100 or permission of instructor.

8110. Studies and Research in School Administration. (3).

A study of emerging concepts of school administration. The areas to be covered with emphasis research and studies in the elements of administrative behavior, the dynamics of administration, and the administrative process. PREREQUISITE: Permission of instructor.

8120. Economics of Education. (3).

The study will consist of the theory and practice of education as an economical factor in American society; local, state, and federal sources of school revenue; and the process of public school expenditure. PREREQUISITE: Education 7120 or permission of instructor.

8140. Advanced School Plant and Practicum. (3).

Emphasis will be placed on the work of the district and state director of school plant planning; the preparation of educational specifications; blueprint reading in relation to educational specifications; and current practices and literature in school plant planning. The student will spend time in field trips and field work concerned with effective and efficient school plant planning and construction. PREREQUISITE: Education 7140 or permission of instructor.

8160. The Administration of Pupil Personnel. (3).

This course acquaints the student with pupil personnel services including accounting, reporting, classification, attendance, and problems of pupils' adjustment to the school situation. PREREQUISITE: permission of instructor.

8180. Seminar in School Law. (3).

A seminar incorporating the body of school law, both statutory and case. Students will be given the opportunity to explore judicial interpretations and legal principles underlying statutes and court decisions. Opportunities will be given to develop these topics so as to reach larger issues of policy in school administration. PREREQUISITE: permission of instructor.

8189. An Overview of Higher Education. (3).

This course is an orientation of higher education and will deal in breadth with the facets of higher education vital to an understanding of the field. It is designed to build a professional perspective toward higher education.

8190. The Organization and Structure of Higher Education. (3).

Educational policies, functions, and practices in the administration of higher institutions, with emphasis upon the various types of organizational structure and services. PREREQUISITE: permission of instructor.

8191. The Community College. (3).

A survey of the history and philosophy of the community college, its place and function, establishment and control, administration, curriculum, staff, supporting physical plant, student population, guidance, and public relations. PREREQUISITE: permission of the instructor.

8200. The Administration of Instructional Programs and Materials. (3).

Practices and the processes used by administrative and supervisory leaders who plan, organize, and co-ordinate the professional activities of teachers in improving pupil-learning experiences. PREREQUISITE: permission of instructor.

8210. Seminar in Educational Supervision. (3).

The course will involve intensive studies of development and research in the supervision of the several areas of instruction in the public schools. Emphasis will be placed on identifying effective techniques to meet current instruction improvement requirements. PREREQUISITE: permission of instructor.

8300. The School Survey. (3).

The history and development of public school surveys, with a critical study of current practices, trends and objectives. Long-term planning of educational programs is emphasized. Field experience in school surveys will be made available to students taking the course. PREREQUISITE: Education 7300 or permission of instructor.

8400. Administrative Leadership and School Public Relations. (3).

This course is designed to improve executive communications involved in the projection of a desirable school image. Emphasis will be placed on public relations, news media, and school publications. PREREQUISITE: permission of instructor.

†9000. Doctoral Dissertation. (3-12).

†Grades of S, U, or IP will be given.

ADULT EDUCATION (ADED)

PROFESSOR DONNIE DUTTON, *Director*

Room 202, College of Education Building

Students majoring in Adult Education will complete a Master of Education Degree which is offered with a thesis or without a thesis. Adult educators and prospective adult educators may select either plan. The program is a *non-certificated one; however, anyone desiring to teach in the public schools must meet the State Board of Education's certification or employment standards. Prerequisites for admission to the program are 6 semester hours of upper division undergraduate or graduate work in psychological, sociological, philosophical or historical foundations.

Students taking a Master's Degree with a major in Adult Education must meet the following requirements:

1. At least 15 semester hours must be taken in those courses with an ADED prefix.
2. ADED 7080, ADED 7130 and EDFD 7521 are required of all students.
3. Nine semester hours must be taken outside the College of Education. However, if the teaching endorsement area (Home Economics, Physical Education, etc.) is offered in the College of Education, the 9 hours may be taken within the college. Minimum Total: 33 semester hours, excluding prerequisites.
4. Prior to graduation each candidate must pass a comprehensive examination which may, at the discretion of the department, be oral or written, or both.

*NCATE does not accredit programs for non-certificated personnel.

ADULT EDUCATION (ADED)

7080. Introduction to Adult Education. (3).

This course will provide an overview of the field of adult education. Emphasis will be given to philosophy, objectives, and nature of adult education, its problems and possible solutions. Further emphasis will be placed on historical development, program planning, methods and techniques, the nature of the adult learner, and financing.

7081. Methods, and Techniques in Adult Education. (3).

After examining the characteristics unique to the educated and uneducated adult, emphasis will be placed on the analysis of the methods and techniques available for working with adults, including the community development method, and their applicability under varying circumstances.

7082. Programming in Adult Education. (3).

Emphasis will be given to understanding the theoretical foundations upon which the programming process is predicated, developing a theoretical model, and acquiring the conceptual tools necessary for analyzing the programming process in any adult education organization.

7095. Special Problems in Adult Education. (1-4).

This will enable students to pursue individual interests and needs under the direction and guidance of the faculty. **PREREQUISITE:** Permission of instructor.

7130. The Adult Learner. (3).

A critical examination will be conducted relative to the major learning problems of adults. Emphasis will be given to the factors which affect learning ability, achievement, and motivation throughout the adult life-cycle.

7245. Curriculum Planning in Adult Basic Education. (3).

After examining the unique characteristics of adults, attention will be focused upon principles of curriculum building and their applicability to adult basic education clientele.

7300. Adult Education Seminar. (3-6).

An examination of problems and issues confronting adult education, with emphasis on review and interpretation of related research. **PREREQUISITE:** Permission of instructor.

7720. Practicum in Adult Education. (3).

The course is designed to provide supervised experiences in application of adult education theory and principles in selected meaningful work experiences. **PREREQUISITE:** Permission of instructor.

7996. Supervision Thesis. (3-6).

Master's Thesis.

ELECTRICAL ENGINEERING

PROFESSOR THOMAS D. SHOCKLEY, JR., *Chairman*

Room 206, Engineering Building

The Department of Electrical Engineering offers coursework leading to a Master of Science degree. Students may pursue areas of concentration in the areas of Automatic Control Systems, Engineering Computer Systems, Microwave and Antenna Systems, and Solid State Electronics.

Students who hold the degree Bachelor of Science in Electrical Engineering or an equivalent degree will be admitted to full-time graduate work if their academic record warrants. Students who hold degrees in mathematics or physics will be admitted to the program if their academic record warrants, but they will be expected to take additional coursework to complete their background in basic electrical engineering.

6202. Electrical Power Systems. (4).

Investigation of problems associated with the transmission of electrical energy. Load-flow studies, and fault analysis by use of symmetrical components. PREREQUISITE: Graduate standing and permission.

Three lecture, three laboratory hours per week.

6205. Analog Simulation Techniques. (4).

Introduction to the basic concepts of component and system design of Analog Computers. Application of the Analog computer in the solution of linear and nonlinear engineering problems. PREREQUISITE: Graduate standing and permission.

Three lecture, three laboratory hours per week.

6212. Electromagnetic Field Theory II. (4).

Plane, cylindrical and spherical waves; high frequency transmission lines; introduction to microwave and antenna theory. PREREQUISITE: Graduate standing and permission.

Three lecture, three laboratory hours per week.

6213. Antenna Theory and Design. (4).

Continuation of 6212 with emphasis on the theory and design of antennas. Determination of antenna radiation characteristics. Introduction to antenna array theory. PREREQUISITE: Electrical Engineering 6-4212.

Three lecture, three laboratory hours per week.

6221. Pulse and Digital Circuits. (4).

Timing, scanning, trigger and pulse circuits; astable, bistable and monostable multivibrators; binary counting circuits. PREREQUISITE: Graduate standing and permission.

Three lecture, three laboratory hours per week.

6222. Introduction to Logical Design and Switching Circuits. (3).

Introduction to the analysis and design of logical switching circuits; logic, number systems, digital computer components. PREREQUISITE: Graduate standing and permission.

Three lecture hours per week.

6231. Communication Theory. (3).

Frequency and time domain. Modulation, random signal theory, auto-correlation, basic information theory, noise, communication systems. PREREQUISITE: Graduate standing and permission.

Three lecture hours per week.

6240. Introduction to Quantum Electronics. (3).

Quantum concepts, Schrodinger equation, quantization of electromagnetic radiation. Laser theory and application. PREREQUISITE: Graduate standing.

6241. Physical Electronics. (3).

Fundamental particles: quantum concepts; statistics; crystal structure; thermal, dielectric, magnetic and optical properties of solids; solid state devices. PREREQUISITE: Graduate standing and permission.

Three lecture hours per week.

6251. Control System Engineering. (4).

General equations of physical linear systems and their transfer functions. Transient analysis and stability of control systems. Bode plots, Nichols plot, Routh-Hurwitz criterion, root locus method, introduction to compensation techniques and systems in state space. PREREQUISITE: Graduate standing and permission.

Three lecture, three laboratory hours per week.

7021. Modern Engineering Concepts I. (3).

This course is designed for qualified teachers of mathematics and physical science at the high school level. A course in the theories and the techniques that contribute to life in a modern technological society. Concepts of modeling, and the use of analogies and analog computers in the simulation of processes. An introduction to man and machine logic, and the functioning of digital computers. This course cannot be applied toward a major in engineering. PREREQUISITE: Graduate standing and permission.

Three lecture hours per week.

7022. Modern Engineering Concepts II. (3).

This course is designed for qualified teachers of mathematics and physical science at the high school level. An introduction to digital computer programming and its application. The use of compilers, assemblers, and sub-routines. The study of dynamic systems, and the concepts of stability and feedback. Man-machine systems, and the development of devices for human use. This course cannot be applied toward a major in engineering. PREREQUISITE: Elec. 7021.

Three lecture hours per week.

7201. Electronic Processes in Solids. (3).

Structure of crystals. Quantum concepts. Statistical distributions and transport phenomena. Conduction in conductors and semiconductors. PREREQUISITE: Graduate standing and permission.

Three lecture hours per week.

7202. Solid State Devices. (3).

Continuation of 7201 with emphasis on the analysis of modern solid state devices such as masers and lasers. PREREQUISITE: Electrical Engineering 7201 or permission.

Three lecture hours per week.

7205. Hybrid Simulation Techniques. (3).

Introduction to hybrid computer techniques, hardware and software. Hybrid computer solutions of field problems, parameter optimization and optimal control system problems and man-machine systems. PREREQUISITE: Electrical Engineering 6205 or permission.

Three lecture hours per week.

7211. Advanced Electromagnetic Field Theory. (3).

Advanced studies in electromagnetic fields, radiation and propagation of energy. PREREQUISITE: Elec. 6212 or permission.

Three lecture hours per week.

7212. Wave Propagation in Plasma. (3).

Propagation of electromagnetic waves in homogeneous and inhomogeneous plasma. Dispersion relations, plasma oscillations and energy transfer. PREREQUISITE: Elec. 6212 or permission.

Three lecture hours per week.

7213. Radiation and Antenna Theory. (3).

Radiation characteristics of conducting and dielectric configurations. Theoretical analysis of antennas and antenna systems. Engineering applications of antennas and radiating structure. PREREQUISITE: Elec 6212 or permission.

Three lecture hours per week.

7221. Microwave Engineering. (3).

Analysis of discontinuities in waveguides and cavities. Microwave networks. Perturbational and variational techniques. Faraday rotation in ferrites. PREREQUISITE: Elec. 7211 or permission.

Three lecture hours per week.

7222. Microwave Electronics. (3).

Analysis of electron beams and their interaction with traveling waves and backward waves. Introduction to coupled mode analysis and traveling wave devices. PREREQUISITE: Elec. 7221 or permission.

Three lecture hours per week.

7231. Transistor Circuit Analysis and Design. (3).

Analysis and design of small and large signal transistor amplifiers. Multi-stage amplifiers. Analysis and design of oscillators. Feedback and stability in amplifier design. PREREQUISITE: Graduate standing and permission.

Three lecture hours per week.

7232. Advanced Semiconductor Circuit Design. (3).

Continuation of 7231. Design and application of negative resistance devices. Parametric devices, noise theory; application of these devices in communications systems. PREREQUISITE: EE 7231.

Three lecture hours per week.

7240. Analysis and Design of Linear Networks. (3).

Analysis of two port networks, ideal response characteristics, synthesis of passive networks, and equivalent circuit representation of active networks. PREREQUISITE: Graduate standing and permission.

Three lecture hours per week.

7241. Network Synthesis. (3).

Introduction to the modern network synthesis techniques. Synthesis using ladder networks, lossy elements and iterative methods. PREREQUISITE: Electrical Engineering 7240 or permission.

Three lecture hours per week.

7251. Random Signals and Noise. (3).

Statistical methods for describing and analyzing random signals and noise. Autocorrelation, cross-correlation and spectral density functions. Optimal linear filter theory. PREREQUISITE: Elec. 6231 or permission.

Three lecture hours per week.

7252. Information Theory. (3).

Introduction to entropy and channel capacity, group codes, block codes, cyclic codes. Application of coding techniques to improve system reliability. Error correcting codes. PREREQUISITE: Electrical Engineering 7251 or permission.

Three lecture hours per week.

7261. Logical Design and Switching Circuits. (3).

Analysis and design of switching circuits; logic, number systems, digital computer components, synthesis of sequential switching circuits. PREREQUISITE: Elec. 6222, or permission.

Three lecture hours per week.

7262. Introduction to Finite Automata Theory. (3).

Finite-state sequential machines, neural networks, man-machine systems, pattern recognition, language structures, and probabilistic automata theory. PREREQUISITE: Electrical Engineering 7261 or permission.

Three lecture hours per week.

7521. Advanced Control System Engineering I. (3).

Cascade and feedback compensation. Analysis and control of nonlinear systems. Introduction to adaptive control systems and optimal techniques. PREREQUISITE: Electrical Engineering 6251 or permission.

Three lecture hours per week.

7522. Advanced Control System Engineering II. (3).

Continuation of 7521. Performance criteria for optimum design, computer usage in optimum design. Adaptive control and learning systems. PREREQUISITE: Electrical Engineering 7521 or permission.

Three lecture hours per week.

7991. Projects I. (3).

Independent investigation of a problem selected in consultation with instructor; report required. PREREQUISITE: Graduate standing and permission.

Nine laboratory hours per week.

7992. Projects II. (3).

Independent investigation of a problem selected in consultation with instructor; report required. PREREQUISITE: Graduate standing and permission.

Nine laboratory hours per week.

†7996. Thesis. (6).

Master's thesis.

†Grades of S, U, or IP will be given.

ELEMENTARY EDUCATION

PROFESSOR HARRY B. MILLER, *Chairman*

Room 417, The College of Education Building

In the Department of Elementary Education students may select from several programs as follows:

- A. Master of Education — Elementary Education. Candidates must have had at least two years of teaching experience or its equivalent (to be determined by Department Chairman) before the degree is awarded. Course requirements are: EDPS 7111, EDFD 7521, ELED 7201, and EDUC 7401 or EDFD 7001, 9 semester hours of electives in Elementary Education, 9 semester hours from The College of Arts and Sciences, and 3 semester hours of free electives. Minimum total: 33 semester hours.
- B. Master of Education — Reading — This program is designed for those who wish preparation as a teacher of reading. It will provide the teacher with a greater competency in meeting the individual needs of the students in his classroom. It will also provide him with the skills needed to assume the role of a remedial reading teacher or a curriculum consultant in reading at the elementary and secondary levels. Students will have had two years of successful teaching experience or its equivalent (to be determined by the Director of the Reading Center) before becoming a candidate for the degree. Course requirements are: READ 7243, 7244, 7245, 7843, EDFD 7521, 6 semester hours of electives in reading, 9 semester hours from The College of Arts and Sciences, and 3 semester hours of free electives. Minimum total: 33 semester hours.
- C. Master of Education — Elementary Education (Early Childhood). Candidates must have had at least two years of teaching experience or its equivalent (to be determined by the Department Chairman) before the degree is awarded. Course requirements are: EDPS 7111, EDFD 7521, ELED 7201 and EDUC 7401 or EDFD 7001, 9 semester hours of electives in Elementary Education, 9 semester hours from the College of Arts and Sciences and 3 semester hours of free electives. Minimum total: 33 semester hours.
- D. Master of Education — *Reading.
The program is designed for individuals who have an interest in clinical diagnosis and treatment of reading problems. It is not open to certificated teachers or available to elementary or secondary school teachers seeking certification. Admission requirements are the same as those for the regular M.Ed. program, except that no teaching certificate is required. Prerequisites for admission to the program are six semester hours of course work at the upper division undergraduate or graduate level in psychological, historical, sociological or philosophical foundations of education. Course requirements are: READ 7243, 7244, 7245, 7843, 9 semester hours of electives in Reading, EDFD 7521, and 9 semester hours outside the College of Education. Minimum total: 33 semester hours, excluding prerequisites.
- E. Education Specialist — Curriculum and Instruction (Elementary Education) or (Reading). Requirements: 30 semester hours in the major concentration, 6 semester hours of electives in the College of Education, EDPS 7121, EDUC 7401, EDFD 7001, 7521, 7541, and 15 semester hours outside the College of Education. Additional information pertaining to specific course requirements in the major and collateral areas may be secured from the Department of Elementary Education. Minimum total: 66 semester hours of graduate credit with a minimum of 9 semester hours in courses numbered 8000 or above.
- F. Doctor of Education — Curriculum and Instruction (Elementary Education) or (Reading). Requirements: 45 semester hours in the major concentration, 12 semester hours of electives in the College of Education, EDUC 8950, EDPS 7121, EDUC 7401, EDFD 7001, 7521, 7541, either 8521 or 8542 and 21 semester hours of collateral outside the College of Education. Additional information pertain-

ing to specific course requirements in the major and collateral areas may be secured from the Department of Elementary Education. Minimum total: 99 semester hours of graduate credit with a minimum of 21 semester hours selected from courses numbered 8000 or above.

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ELEMENTARY EDUCATION (ELED)

6211. Comparative Study in Early Childhood Education. (3-6).

The study of programs for young children in the United States and other countries focusing on the relationship between the program and the values the society holds. Comparisons of programs will be made with emphasis on how aspects of a program could be modified to meet the needs of children from a different culture. Foreign and domestic travel may be planned in conjunction with this course. **PREREQUISITE:** Consent of instructor.

6701-20. Workshops in Elementary Education.

This is a workshop for teachers who wish to improve their teaching skills. Various curriculum areas will be explored and many alternate solutions to problems of teaching will be included.

6701. Workshop—Improvement of Instruction. (1-3).

6702. Workshop—For Teachers of the Disadvantaged. (1-3).

6703. Workshop—Elementary Curriculum. (1-3).

6704. Workshop—Elementary Science Education. (1-3).

6761. Aerospace Education in Schools. (3).

The purpose of this course is to provide teachers with aerospace knowledge and experiences and ways of utilizing this knowledge and experience in the classroom.

†6811. Supervised Practicum in Kindergarten. (3-6).

(formerly Directed Student Teaching in the Kindergarten)

Observation of the growth and development of pupils and methods of teaching; participation in school activities, culminating in assuming responsibility for teaching entire groups.

†6821. Supervised Practicum in the Elementary School. (3-9).

(formerly Directed Student Teaching in the Elementary School)

Observation of the growth and development of pupils and of methods of teaching; participation in school activities, culminating in assuming responsibility for teaching entire groups.

†6822. Supervised Practicum in the Elementary School. (3-6).

(formerly Directed Student Teaching in the Elementary School)

For the student who has completed six semester hours or less of student teaching in the elementary school and desires some additional experience.

7112. Parent-Teacher-Child Relationships. (3).

This course is designed to develop insight into the parent-teacher, parent-child, and child-teacher relationships, to explore ways of working with parents, and to develop techniques for reporting children's progress to parents of nursery, kindergarten, and primary children. **PREREQUISITE:** Elementary Education 7111.

- 7113. Independent Study in Early Childhood Education. (1-3).**
Independent investigation and report of a research problem or directed readings in a selected area of early childhood education in consultation with a faculty member.
- 7201. Trends in Elementary Education. (3).**
Trends in classroom organizations and procedures. Innovations, approaches and directions applicable to the improvement of instruction are considered.
- 7211. Values and Principles of Early Childhood Education. (3).**
This course is designed to study current curricula, trends and issues related to kindergarten through the primary grades. Emphasis will be placed on the principles and values of early childhood education; current research; selection, organization, evaluation of learning experiences.
- 7220. Field Study of Exemplary Elementary Education Programs. (3-6).**
The course is designed to provide an opportunity to examine outstanding education programs through on-site visitations as well as to participate in seminars related to the supportive research.
- 7241. The Teaching of Children's Literature in the Elementary School. (3).**
This is a course designed to improve the methods of teaching children's literature in the elementary school. Units on story telling, dramatization, choral speech work, and the correlation of literature with the content subjects will be carried out.
- 7242. Advancing the Teaching of Language Arts. (3).**
Designed to review the current research and thinking that stresses the use of language in the process of communication. Using research as a means to develop further understanding, students will develop projects in listening, speaking and writing. Special emphasis will be given linguistics and the socioeconomic influences on language.
- 7252. Issues and Trends in Teaching Elementary Mathematics (3).**
This course is designed to study and do research on issues and trends in teaching elementary mathematics. Such topics as experimental programs, concept of "modern math," curriculum, classroom methods and techniques, evaluation procedures, teacher training, and inservice education will be covered. PREREQUISITE(S): (if any) 3251 or 4252.
- 7253. The Teaching of Intuitive Geometry in the Elementary School. (3).**
Teaching of intuitive geometry as it occurs in the elementary grades. Because of the increased recognition geometry is receiving, this course provides the elementary teacher with a wide variety of activities useful with elementary children.
- 7254. Seminar in Elementary Mathematics Education. (3).**
Specialized study and research dealing with selected problems in elementary mathematics education. Designed for teachers, supervisors, and administrators. Students are expected to do research, prepare papers, and discuss their research findings and experiences. PREREQUISITE: Teaching experience and ELED 3251 or ELED 4242.
- 7262. The Teaching of Science in the Elementary School. (3).**
Current developments in elementary science education in both process and content. Examination of new curriculum materials and involvement in learning experiences appropriate for elementary school. Designed primarily for in-service teachers.

7263. Seminar and Readings in Science Education. (3).

A survey of selected current problems and research in science education. Class members are expected to prepare papers and/or participate in discussion. PREREQUISITE: ELED 7262 or its equivalent.

7264. Elementary School Science: Curriculum and Supervision. (3).

A survey of the problems involved in the supervision of elementary science instruction and program evaluation. Special attention is given to the supervision of student teachers, in-service teachers, science workshops, in-service programs and special science programs.

7272. Current Curriculum Development in Social Science Education (3).

Emphasis on current developments which are consistent with the needs, interests, and social problems which elementary school children face today. Each student is expected to be familiar with research, new programs and issues related to social science education.

7273. The Teaching of Social Studies in the Elementary School. (3) .

Developing teaching practices with respect to the varying models of social studies curriculum in elementary education.

7311. Studying the Elementary School Child. (3).

A study of the operational tools and underlying concepts used in analyzing and diagnosing children ages 3 thru 12 with respect to their physical, social, emotional, and intellectual development with an emphasis on application of the findings in terms of individually prescribed curriculum.

7411. Curriculum Development and Techniques of Teaching Nursery, Kindergarten and Primary Children.

This course is designed to investigate innovative curricula methods and techniques for teaching nursery, kindergarten, and primary children. The subject matter areas studied are mathematics, science, social science, music, and language arts.

7701. Workshop in Family Finance Education. (1-6).

This course is designed to assist teachers in using materials, information, and techniques for improving instruction in family finance through units in regular classes. PREREQUISITE: Permission of instructor.

7991. Special Problems in Instruction. (1-3).

Individual investigation and report in the area of classroom instruction under the direction of a faculty member.

†7996. Thesis. (3-6).

Only students with superior scholarship are permitted to register in this course. The student must present in writing an outline describing the proposed thesis. This outline, when approved by the faculty members under whose direction the thesis is to be written, must be submitted to the Chairman of the Department of Elementary Education for his approval. This course will involve writing the thesis and will emphasize the adequate setup of the problem, the collection of the data, their use, and conclusions to be reached.

Application for writing a thesis must be filled out on an approved form after consultation with the major professor and filed with the Dean of The Graduate School at the time of registration.

8201. Survey of Innovative Practices in Elementary Education. (3).

A survey, evaluation and possible applications of innovative practices concerning theory and practice in the elementary school.

- 8202. Seminar in Elementary Education. (3).**
Basic concepts and programs in elementary education with special emphasis on current literature in the field.
- 8211. Seminar in Early Childhood Education. (3-6).**
Systematic study of current professional and research literature in the field of early childhood education.
- 8272. Seminar in Social Science Education. (3).**
A survey of current problems in social science education.
- 8273. Research in Elementary School Social Studies. (3).**
Review and analysis of significant research in the field of Elementary School Social Studies.
- 8421. Elementary School Curriculum. (3).**
An appraisal of modern curriculum practices, including emphasis on underlying philosophies, as they affect the child, his potential, and his growth.

READING (Read)

- 6751. Workshop in the Reading Program. (3-6).**
Designed to utilize the reading conference, group study, discussion, demonstration, and directed practice to study problems of reading. Participants will have an opportunity to pursue their own reading related problems to content, methods, materials, and evaluation.
- 7243. Modern Reading Instruction. (3).**
Designed to survey the methods, materials, and approaches used in the teaching of reading. An in-depth analysis of one of these approaches is required of each student. This analysis will be concerned with the history, philosophy, materials, and research supporting each approach.
- 7244. The Diagnosis of Reading Problems. (3).**
(formerly 7246, Diagnostic and Remedial Reading in Elementary and Secondary Schools)
Designed to develop an understanding of the principles of measurement and evaluation in reading. It is organized to stress the formal and informal techniques used by the classroom teacher in assessing a child's reading potential. Careful consideration is given to the multiple causation approach to reading difficulties. This enables an in-depth analysis of the child, the home, the community, and the school. PREREQUISITE: Teaching experience and READ 7243.
- 7245. The Treatment of Reading Problems. (3).**
Designed to provide a knowledge of materials, programs, and techniques used to correct reading disabilities. Through observation and demonstration it emphasizes the corrective, remedial, and clinical approaches to the treatment of reading problems. PREREQUISITE: READ 7243 and 7244.
- 7246. Teaching Reading to Exceptional Children. (3).**
Designed as a problem centered course which emphasizes research and reporting on the problem of teaching reading to the exceptional child. Topics such as the bright and gifted child, the disadvantaged child, the slow learner, and the physically handicapped child will be discussed from the aspects of identification, treatment, and materials for instruction.

7247. Teaching Reading for and Through the Subject Areas (Primarily Elementary). (3).

A course to give a teacher of any subject at elementary or secondary level knowledge of reading skills necessary for most efficient study in that field, and to show how reading instruction may be concomitant with learning of the content of any discipline. Classroom diagnosis of pupils' reading skills and development of materials are aspects of the course. (Credit in this course may not apply toward a degree if the student has credit in 4344 or 6344.)

7248. Teaching Reading in the Secondary Schools. (3).

Designed for teachers of the content subjects in grades 7 through 12 with major emphasis on the role of reading in the learning process. Research and evaluation are stressed as well as an analysis of materials employed in specific reading improvement programs. There is also an emphasis on instructional methods.

7344. Teaching Reading in the Content Areas. (3).

Designed to emphasize the reading skills necessary for mastery of the academic disciplines. Techniques for teaching technical vocabulary, comprehension, study skills as well as selective reading rates will be taught. Attention will be given to the younger child's first adventure into new areas of interest.

7442. Curriculum and Supervision in Reading. (3).

Designed to study various curricula in the elementary and secondary school which involves reading. Specialized curricula for graded and non-graded school systems will be discussed. Student will be expected to develop and evaluate curricula for reading. PREREQUISITE: READ 7243, 7244, and 7245.

7843. Supervised Practicum in Reading Program. (3).

Designed to develop a student's skill in putting a reading program in operation. Under the guidance of the Reading Center staff, students will be required to plan, initiate, and carry out a desirable reading program. The Programs will vary from basal reading programs in the primary grades to specialized programs for classrooms of handicapped children. PREREQUISITE: EDFD 7521.

8533. Seminar in Reading Research I. (3).

Designed to help students refine their research techniques through systematic and scientific appraisals of current research. Special attention will be given to understanding research design and statistics. Group and individual evaluations will be written and presented. PREREQUISITE: READ 7243, 7244, and 7245.

8534. Seminar in Reading Research II. (3).

Designed to lead the prospective doctoral student into the research and design for a scientific study in reading. Students will be required to design an original research study in some area of reading. Each study will contain an introduction, review of related research, statement of problem, outlines of procedures, materials and statistical techniques. PREREQUISITE: READ 8533.

8841. Reading Clinic I. (3).

Designed to provide the student with the practical experiences of clinical diagnosis. Through observation, demonstration, and actual laboratory experience the student will learn how to administer and interpret clinical instruments. Each student will be required to write a detailed case study diagnosing specific weaknesses and their probable causes. PREREQUISITE: READ 7243, 7244, and 7245.

8842. Reading Clinic II. (3).

Designed to provide the student with the practical experience of working with a disabled reader in a clinical situation. Through observation, demonstration and actual clinical experience the student will learn how to treat a variety of reading disabilities. Special attention will be given to developing specifically prescribed instruction based on diagnostic case study results. PREREQUISITE: READ 8841.

†Grades of S, U, or IP will be given.

ENGLISH

PROFESSOR WILLIAM OSBORNE, *Chairman*

Room 467, Patterson Hall

In the Department of English, graduate students who select English as a major area will consult their major adviser as to the program of study. The basic requirements are as follows:

Prerequisites: A minimum of 18 hours in upper division English courses, with a minimum grade point average of 2.5 in those courses.

Requirements: A minimum of 18-21 hours in graduate English courses, at least 12 of which must be in courses numbered above 7000. Each student's program must include the following:

- A. Bibliography and Methods of Research (3): English 7801.
- B. Chaucer or Studies in Medieval Literature (3): English 6231 or 7211.
- C. Studies in Shakespeare or Studies in Renaissance Literature (3): English 7231 or 7212.
- D. The literature of two additional periods of English or American literature (6).
- E. All graduate courses in English (3-6): selection to be made with approval of adviser.
- F. To complete the course work required for a Master of Arts degree in English, a student must take 12 additional hours. Normally English majors will elect to take their courses in English. In some instances, advisers may recommend that the student take one or more courses in an area other than English, such as philosophy, history, or a foreign literature. Such exceptions should, however, relate to the student's major interest and specific program.

Oral comprehensive examination.

Reading knowledge of one foreign language (French, German, Latin, or Greek), to be demonstrated by (1) 12 hours credit at the minimum grade in each course of C, earned within the last five years prior to entry into Graduate School or by (2) reading examination by date of completion of 9 semester hours of graduate courses in English.

Thesis (3 or 6)—optional.

A 3.0 average in English courses.

For the collateral area, requirements in the Department of English are as follows:

Prerequisites: A minimum of 12 hours in upper division English courses, with a minimum grade point average of 2.5 in those courses.

Requirements: A minimum of 12 hours in graduate English courses, at least 6 of which must be in courses numbered above 7000.

Each student in English must complete at least
 3 hours in English literature before 1800 and at least
 3 hours in English literature after 1800.

A 3.0 average in English courses.

Students not majoring in English must have at least 12 semester hours of upper division English courses with at least a 2.0 average in those courses as a prerequisite for taking any graduate course in English, except 7001.

6231. Chaucer. (3).

A study of Chaucer's growth as a literary artist, including a chronological reading of representative works and discussion of their philosophical and social context.

6234. Milton. (3).

A study of Milton's development as a literary artist, with emphasis on his poetry but with some attention to his prose.

6241. The English Novel. (3).

Reading of major English novels from the Renaissance to the mid-nineteenth century related to study of the origin and development of the genre.

6242. The English Novel. (3).

A study of major English novels from the mid-nineteenth century to the present, with attention to developments in the genre.

6251. English Drama. (3).

A study of the development of the genre in England from medieval times to 1642.

6252. English Drama. (3).

A study of English drama from 1660 to the present, with attention to developments in the genre.

6351. American Drama. (3).

The development of American drama as a literary form studied in relation to the English and European tradition and to currents in American thought.

6501. History of the English Language. (3).

Study of the relationship of English to other Indo-European languages; of etymology and the effects of word-borrowing, word-formation, and semantic change on English vocabulary; and of the development of English sounds, inflections, and syntax.

7001. Language and Composition. (3).

This course, open only to high school English teachers, deals with linguistic principles and their application to English grammar and composition. There will be a strong emphasis on the writing and analysis of essays. This course cannot be applied toward a major or collateral area in English.

7211. Studies in Medieval Literature. (3).**7212. Studies in Renaissance Literature. (3).*****7213. Studies in Seventeenth Century Literature. (3).*****7214. Studies in Restoration and Eighteenth Century Literature. (3).*****7221. Studies in the Literature of the Romantic Period. (3).*****7222. Studies in Victorian Literature. (3).*****7223. Studies in Contemporary Literature. (3).*****7231. Studies in Shakespeare. (3).*****7321. Studies in American Literature before 1860. (3).*****7322. Studies in American Literature since 1860. (3).*****7501. Studies in English Linguistics. (3).****7701. Literary Criticism. (3).**

The major documents in Western criticism, from Plato to the present.

7801. Bibliography and Methods of Research. (3).

Examination of bibliographical aids for the study of English and American literature, problems involved in various types of research, and study of the presentation and documentation of scholarly writing.

†7996. Thesis. (3-6)

A prospectus for the thesis must be approved by the student's adviser and the departmental chairman before the student registers for this course. Formal application for writing a thesis must be filed with the Dean of the Graduate School at the time of registration. The completed thesis must be approved by at least two readers.

†Grades of S, U, or IP will be given.

*Courses designated *Studies* provide for specialized work in the literature and in the scholarship of periods, figures, and genres. Content and focus of *Studies* courses may vary from semester to semester. Students will be expected to engage in research leading to the production of substantial papers. Ideally they should have had previous work in the material of these courses. They should, in any case, enroll in *Studies* for which they have had some relevant preparation.

FINANCE, INSURANCE AND REAL ESTATE

PROFESSOR PETER F. FREUND, *Chairman*

Room 402, The College of Business Administration Building

In the Department of Finance, Insurance, and Real Estate, qualified students may work toward the M.S. with a major in Finance or the M.B.A. with an area of concentration in Finance, Insurance and Real Estate.

A. Requirements for the M.B.A. degree are summarized on page 62.

B. Prerequisites for the M.S. in Finance.

In addition to Core I prerequisites, students should have completed or complete all necessary prerequisites for the advanced course work.

C. Each candidate for the M.S. degree must complete a minimum of 33 semester hours and pass a written and/or oral examination. The 33 semester hours comprising the M.S. degree include 21 semester hours of approved work in the major (24 if a thesis is written) and 9 to 12 semester hours in collateral courses approved by the student's adviser. At least 24 of the 33 semester hours required must be in courses designated primarily for graduate students (7000 level or above).

6011. Law of Taxation and Planning of Estates. (3).

A survey course of the law of taxation as applied to the transmission of property by gift or death and its impact upon accumulations of wealth. Estate planning from an individual viewpoint designed to create, maintain, and distribute the maximum estate possible. PREREQUISITE: FIR 3011 or consent of the instructor.

6310. Real Estate Law. (3).

This course covers law and legal instruments as applied to real estate. It is designed to serve the needs of property owners and those engaged in the real estate business. PREREQUISITE: FIR 3310.

6320. Real Estate Finance. (3).

Examination and analysis of the sources of funds for financing real estate transactions including FHA and VA types. PREREQUISITE: FIR 3310.

6330. Determinants in Housing Finance. (3).

Consideration of determinants of private and public demand for housing; the relationships between construction and economic trends; new town legislation, urban renewal and development, improving environment and housing for low income groups, criteria for assessing public policy, policy implementation; the role of private enterprise in developing, maintaining and improving housing. PREREQUISITE: FIR 3310.

6340. Real Estate Appraisal. (3).

This course covers the fundamentals of appraising residential, commercial and industrial real estate. PREREQUISITE: FIR 3310.

6610. Cases in Managerial Finance. (3).

A case course emphasizing the application of tools and principles introduced in previous courses to develop up-to-date problem solving techniques. Cases are approached from the standpoint of top level management and utilize both quantitative and qualitative analysis. PREREQUISITE: FIR 3410 or consent of instructor.

6810. Property and Casualty Insurance. (3).

The form and functions of fire, marine, automobile, general liability, and other types of property and casualty insurance with emphasis on their application to commercial and industrial occupancies. A survey of current underwriting practice. PREREQUISITE: FIR 3810.

6820. Life and Health Insurance. (3).

The functions of life and health insurance with emphasis upon the need for insurance and the service of life and health insurance to the American family and community. A study of the mechanics of private and public insurance and annuities. PREREQUISITE: FIR 3810.

6840. Functional Aspects of Property and Liability Insurance Carriers. (3).

Company and industry functions other than contract, including rating, rate-making, reserves, auditing, underwriting, reinsurance, claims, production, engineering, and governmental supervision. PREREQUISITE: FIR 3810.

7001. Business and Its Environment. (3).

A critical examination of the environment in which business operates. Emphasis is on development of a broad understanding of social, political, and legal forces affecting the conduct of business. Restraints, conflicts, agreements, and unresolved problems are studied utilizing both lectures and case discussion.

7301. Seminar in Real Estate Finance, Investments and Valuation. (3).

An investigation of significant current topics in real estate finance, investments and valuation. Individual research and group discussion of recent developments in theory and practice. PREREQUISITE: Consent of the instructor.

7610. Analysis and Control of Business. (3).

An overall study of the finance function of business; application of financial management techniques to acquiring and utilizing funds and controlling various phases of the business operation, with special attention to the integration of finance with other disciplines. PREREQUISITE: FIR 3410.

7620. Current Topics in International Finance. (3).

Study of selected problems in international finance, foreign investment and the international payments system; gold movements; foreign central banking and international aspects of money markets; the impact of international financial problems on business and efforts at international financial cooperation. PREREQUISITES: FIR 3410; Economics 3610.

7710. Seminar in Investments. (3).

Advanced study of the objectives of investment management. Consideration of the functions and procedures of security markets, money and capital markets and their instruments including investment banking, institutional portfolio selection, and government regulation of the organized securities exchanges and over-the-counter markets. PREREQUISITE: Finance 3710 or consent of the instructor.

7720. Seminar in Current Topics in Finance. (3).

An investigation of significant current topics in theory and practice in the areas of domestic and international finance. Individual research and group discussion employing a wide variety of available materials are emphasized. PREREQUISITE: Consent of the instructor.

7810. Seminar in Theory and Practice of Financial Management. (3).

Survey of current, advanced literature dealing with the *development* of concepts and applications presented in the form of oral reports and turned in as a term paper. Cases would be required, concentrating upon complex financial topics. PREREQUISITE: FIR 7610.

7910. Problems, in Finance, Insurance, and Real Estate. (2-4).

Directed independent reading and research projects in the finance, insurance, or real estate areas selected by the student with approval of the staff member supervising.

†7996. Thesis. (3-6).

Candidates desiring to write a thesis must fill out an application on the approved form after consulting with the major professor. The application must be filed with the Dean of The Graduate School.

†Grades of S, U, or IP will be given.

FOREIGN LANGUAGES

PROFESSOR FRANKLIN O. BRANTLEY, *Chairman*

Room 375A, Mathematics and Foreign Languages Building

In the Department of Foreign Languages, graduate students who select French, German, or Spanish as a major area will be assigned a major adviser by the department chairman. This adviser is to be consulted in all matters concerning the student's program of study. It is the responsibility of the student to obtain from the department office copies of the information sheet for the Master of Arts Program and the Required Reading List for detailed descriptions of requirements.

Prerequisites: (1) A minimum of 18 upper division semester hours or its equivalent in the language of the major (French, German, or Spanish); (2) a reasonable proficiency in the language of the major, to be determined by the department prior to admission.

Requirements: (1) A total of 30 semester hours for candidates writing a thesis; (2) a total of 33 semester hours for candidates not writing a thesis; (3) Nine semester hours may be taken in an approved collateral area; (4) at least 18 hours must be taken in 7000 level courses, and if a collateral area is elected, a minimum of 12 of these 18 hours must be in the major area; (5) a reading knowledge of an approved second language (other than English) to be demonstrated by examination prior to the completion of course work; (6) M.A. candidates in French, German, or Spanish who are not native to English must demonstrate adequate control of English by examination prior to the completion of course work; (7) a comprehensive written examination after completion of all course work; (8) if a thesis is presented, an oral examination on the area of the thesis.

LINGUISTICS

7101. Introduction to Linguistics. (3).

Language families and dialects; problems in phonology, morphology, and syntax; structural linguistic theory and practice. Recommended for language teachers.

7201. Romance Philology. (3).

An introduction to Vulgar Latin and a study of its development into the modern Romance Languages.

FRENCH

6301. French Phonetics. (3).

The theory and practice of French sounds; especially recommended for teachers of French.

6305. French Stylistics. (3).

Translations of English prose into French with an emphasis on style and grammar. Required of all graduate assistants in French and recommended for all French majors and teachers of French.

6431. The Nineteenth Century French Novel. (3).

The French novel from the Revolution to the twentieth century, treating the movements of Romanticism, Realism, and Naturalism as they are reflected in the works of such authors as Balzac, Stendhal, Flaubert, and Zola.

6432. The Contemporary French Novel. (3).

A general survey of the twentieth-century French novel, treating the works of such authors as Proust, Gide, Mauriac, Malraux, Sartre, Camus, Maurois, and others.

6451. The Nineteenth Century French Drama. (3).

French drama of the nineteenth century, including such authors as Hugo, Augier, Dumas *fils*, and Rostand.

6452. The Contemporary French Drama. (3).

From Becque and his school, the *Theatre Libre*, and Rostand to the present, with emphasis on the twentieth-century drama and such playwrights as Pagnol, Claudel, Tristan Bernard, Giraudoux, Anouilh, Montherlant, Camus, Sartre, Cocteau, and others.

6471. Nineteenth-Century Poetry. (3).

French poetry from Chenier through the Parnassians and the Symbolists.

6501. Applied French Linguistics. (3).

The application of modern linguistic theories to learning French.

6781. History of Criticism of French Literature. (3).

A study of the main theories of literary criticism from the Renaissance through the 20th Century, with an introduction to methods of research.

7401. Old French. (3).

Introductory seminar. Historical grammar and study of the *Chanson de geste*; also the *Lais* of Marie de France and *Aucassin et Nicolette*.

7421. The French Renaissance. (3).

The new world—literary, as seen in the works of Ronsard and the Pleiade; philosophical and political, in those of Rabelais and Montaigne.

7425. Classicism Prior to 1660. (3).

Precept and example before Corneille: Jean de Mairet. The theater of Corneille and the early plays of Moliere.

7426. Classicism After 1660. (3).

The impact of Boileau and *l'Art poetique* in crystallizing the classical principles and pattern. Masterpieces of Moliere and Racine. Representative selections from masters of the other *genres* in this period of French literature.

7491. Seminar in French Literature. (3).

Introduction to research through investigations of limited scope. May be repeated for credit.

7492. Research in French Studies. (1-6).

May be repeated for credit toward the French major up to a maximum of six hours.

7531. The Age of the Enlightenment. (3).

Comprehensive study of literary trends and innovations within the major *genres* as related to liberal ideas underlying the philosophy of Montesquieu, Voltaire, Diderot, Rousseau, and their contemporaries.

†7791. The Teaching of French. (1).

Required of all graduate assistants in French.

†7996. Thesis. (6).

The thesis in French carries six semester hours and must be approved by the candidate's thesis committee.

GERMAN

6301. **Advanced Grammar. (3).**
A thorough and systematic presentation of German grammar with an emphasis on teaching. Required of all graduate assistants in German and recommended for all German majors.
6401. **Early German Literature. (3).**
German literature from its beginning to the end of the medieval period.
6402. **Humanism, Renaissance and Reformation. (3).**
German literature from the end of the medieval period through the Reformation.
6421. **The Baroque Period. (3).**
Studies in the writings of important authors of the Baroque period.
6441. **The Age of Enlightenment and *Sturm und Drang*. (3).**
A study of selected works.
6461. **Twentieth Century Prose and Poetry. (3).**
Study of works of Hesse, Thomas, Mann, Kafka, Rilke, Frisch, and Grass.
6462. **Twentieth Century Drama. (3).**
Study of plays of Gerhart Hauptmann, the German Expressionists, Brecht, Frisch, Durrenmatt, and Peter Weiss.
6481. **Schiller. (3).**
A study of the major writings of Schiller.
6482. **Goethe. (3).**
A study of the major writings of Goethe.
6501. **Applied German Linguistics. (3).**
The application of modern linguistic theories to learning German.
6781. **History of Criticism of German Literature. (3).**
A study of the main theories of literary criticism from the Renaissance through the 20th Century, with an introduction to methods of research.
7304. **Advanced Conversation and Stylistics. (3).**
7401. **Old High German. (3).**
A specialized study of Old High German grammar and representative extant documents augmented by a comparative study of Older Germanic language, history, and literature.
7421. **Middle High German. (3).**
Grammar with selected readings.
7431. **Romanticism. (3).**
German literature of the Early and Late Romantic Eras.
7451. **Goethe's Faust. (3).**
Interpretation of Parts I and II with reference to antecedents, genesis, and relationship to the poet's life and times.

- 7481. The Age of Realism. (3).**
German literature and thought from 1830 through 1880.
- 7482. Naturalism, Impressionism, and Expressionism. (3).**
Literary and philosophical movements from 1880 through 1930.
- 7491. Seminar in German Literature. (3).**
Introduction to research through investigations of limited scope. May be repeated for credit
- 7492. Research in German Studies. (1-6).**
May be repeated for credit toward the German major up to a maximum of six hours.
- †7791. The Teaching of German. (1).**
Required of all graduate assistants in German.
- †7996. Thesis. (6).**
The thesis in German carries six semester hours and must be approved by the candidate's thesis committee.

SPANISH

- 6301. Spanish Phonetics. (3).**
The sounds and intonation patterns of Spanish: analysis and practice; comparison with the sounds and intonation patterns of English. Especially recommended for teachers of Spanish.
- 6302. Advanced Grammar. (3).**
A thorough and systematic presentation of Spanish grammar with an emphasis on teaching. Required of all graduate assistants in Spanish and recommended for all Spanish majors. PREREQUISITE: 3301 and 3302.
- 6421. The Golden Age. (3).**
A study of Spanish lyric poetry and drama of the sixteenth and seventeenth centuries.
- 6422. The Golden Age. (3).**
A study of Spanish prose of the sixteenth and seventeenth centuries.
- 6423. Cervantes. (3).**
A study of *Don Quijote* and the *Novelas ejemplares*.
- 6431. Contemporary Spanish Prose. (3).**
A study of Spanish prose from the Generation of 1898 to the present.
- 6432. Contemporary Spanish Poetry and Drama. (3).**
A study of Spanish poetry and drama from the Generation of 1898 to the present.
- 6501. Applied Spanish Linguistics. (3).**
The application of modern linguistic theories to the learning and teaching of Spanish: recommended for teachers. PREREQUISITES: Spanish 4301/6301, or permission of instructor.
- 6561. Spanish American Prose Fiction I. (3).**
Development of the Spanish American novel and short story from their beginnings through the Mexican Revolution.

6562. Spanish American Prose Fiction II. (3).

The Spanish American novel and short story from the Mexican Revolution to the present. PREREQUISITE: Spanish 3512.

6781. History of Criticism of Hispanic Literature. (3).

A study of the main theories of literary criticism from the Renaissance through the 20th Century, with an introduction to methods of research.

7401. Old Spanish Language and Literature. (3).

An introduction to the general characteristics of medieval Spanish dialects and a study of medieval Spanish texts.

7421. The Picaresque Novel. (3).

Lazarillo de Tormes, *Guzman de Alfarache*, and other novels of the *genre* in the seventeenth century.

7422. Eighteenth Century Spanish Literature. (3).

The nature and background of eighteenth century Spanish literature. The French influence. Typical works of B. J. Feijoo, Luzan, Cadalso, Moratin, Ramon de la Cruz, Padre Isla and others.

7431. Nineteenth Century Spanish Literature I. (3).

Romantic poetry and drama studies in the works of such writers as the Duke of Rivas, Espronceda and Jose Zorrilla. Post romantic poetry and Drama. Becquer. *Costumbrismo*. The romantic and historical novel.

7432. Nineteenth Century Spanish Literature II. (3).

The regional novel, the realistic novel and the naturalistic novel are studied in the works of such writers as Fernan Caballero, Valera, Perera, Palacio Valdes, Galdos, and Blasco Ibanez. The poetry of Campoamor and Nunez de Arce. The theatre. Orators and historians.

7482. The Modernist Movement. (3).

The characteristics and history of the Modernist Movement in Spanish America and in Spain. A study of the leading *modernists*, including Ruben Dario, Nervo, Lugones, and Rodo. Pre-Modernists and Post-Modernism.

7491. Seminar in Spanish Literature. (3).

Introduction to research through investigations of limited scope. May be repeated for credit.

7492. Research in Hispanic Studies. (1-6).

May be repeated for credit toward the Spanish major up to a maximum of six hours.

†7791. The Teaching of Spanish. (1).

Required of all graduate assistants in Spanish.

†7996. Thesis. (6).

The thesis in Spanish carries six semester hours and must be approved by the candidate's thesis committee.

†Grades of S, U, or IP will be given.

FOUNDATIONS OF EDUCATION

PROFESSOR CARLTON H. BOWYER, *Chairman*

Room 404, The College of Education Building

Graduate study in the Department of Foundations of Education is designed to develop an understanding of socio-cultural, psychological and evaluative influences upon the processes of teaching and learning.

The Department of Foundations of Education offers degrees at the Education Specialist and Doctoral levels as follows:

- A. Education Specialist — Curriculum and Instruction (Foundations of Education). This degree is offered by the department with a concentration in Foundations of Education. It requires a minimum of 66 semester hours of graduate work that is approved by the candidate's Advisory Committee. A minimum of 27 semester hours is required in the major concentration and a minimum of 15 semester hours is required in the collateral area outside the College of Education. A minimum of 9 semester hours must be in courses numbered 8000 or above. Basic courses required of all candidates include the following: EDFD 7001, 7511, 7521, 7541, EDPS 7121, and EDUC 7401. Further information pertaining to the Ed.S. degree may be obtained by contacting the Chairman of the Department.
- B. Doctor of Education — Curriculum and Instruction (Foundations of Education). This degree is offered by the department with a concentration in Foundations of Education. It requires a minimum of 99 semester hours of graduate work that is approved by the candidate's Advisory Committee. A minimum of 45 semester hours is required in the major concentration and a minimum of 27 semester hours is required in the two collateral areas: 6 semester hours in a collateral area in the College of Education and 21 semester hours in a collateral area outside the College of Education. A minimum of 21 semester hours must be in courses numbered 8000 or above. In addition to the specific courses listed above as being required for the Ed.S. degree, basic courses required of all candidates include the following: EDUC 8950 and either EDFD 8521 or 8542. Further requirements pertaining to the Ed.D. degree may be obtained by contacting the Chairman of the Department.

Letters following each subheading are course prefixes used by the College of Education.

EDUCATIONAL FOUNDATIONS (EDFD)

6012. History of American Education. (3).

This course aims to trace, describe, and evaluate the development and growth of educational practices, institutions, and theories in the United States from the colonial period to the present.

7001. Foundations of Education. (3).

This course includes a study of the historical, philosophical, and social forces influencing modern American education.

7011. Educational Thought. (3).

This is a study of the evolution of educational theories and philosophies with particular reference to their impact upon educational developments in the United States.

7012. History of Western Education. (3).

(6011)

This course traces through European history some of the more important educational problems of modern times as they have been affected by the social and political acts of history, by the contributions of some of the leading educational theorists, and by institutional practices.

7021. Philosophical Foundations of American Education. (3). (6021)

A critical examination of the basic principles of the major philosophy of education theories (e.g., Experimentalism, Perennialism, Essentialism, Reconstructionism, Existentialism, which have influenced the development of modern public education.

7031. Social Foundations of Education. (3).

This course is designed to study education as a cultural universal. It emphasizes the mutual influence of social institutions and education as well as the factors involved in the socialization of the student personality.

7032. Educational Sociology. (3). (6031)

This course is concerned with the relation of school to community, other social institutions, and social change.

7041. Comparative Education. (3).

This course is designed to offer a scientific study of education in various cultures by exploring the relationships that exist between a given educational system and the philosophy, history, geography, and technology of the people. This course is planned to give background and meaning to the content and method in the area of the social studies with special emphasis on international understanding.

**7511. Measurement and Evaluation. (3).
(formerly Educational Tests and Measurements)**

Consideration of good evaluation practices, the preparation and use of informal objectives and essay-type tests, a study of typical standard tests, and an introduction to elementary statistical procedures. This course is not required of students who have completed a similar course at the undergraduate level.

**7521. Introduction to Educational Research. (3).
(formerly Educational Statistics and Research Methodology)**

This course includes the kinds of research: documentary experimental, case study, descriptive. The student is expected to select a research topic and prepare an appropriate design for it. Functional statistics are included.

7541. Statistical Methods Applied to Education I. (3).

Use and interpretation of statistical methods in education. Instruction in the simpler statistical calculations, such as measures of central tendency, measures of variability, correlation techniques, and procedures in testing statistical hypotheses using educational data. Emphasis is given to the development of the ability to read and interpret statistical data.

8521. Advanced Educational Research. (3).

A study of the methods of philosophy, historiography and descriptive survey in the research processes in education. Attention is given to philosophical analysis, concepts and arguments, and historical method as these are related to source materials, and bibliographic aids in education.

8541. Research Design and Analysis. (3).

A study of single-factor and multi-factor designs using completely randomized or repeated measurements. Stress is given to the application of classical analysis of variance procedures to the interpretation of data and the testing of statistical hypotheses. Linear contrasts are studied, primarily as post-hoc procedures. PREREQUISITE(S): EDFD 7541 or equivalent.

8542. Statistical Methods Applied to Education II. (3).

A second course in educational statistics. Tests of statistical inference, chi-square, simple analysis of variance and covariance, non-parametric methods, partial and multiple correlation, introduction to multi-variance analysis, and related topics. Emphasis is given to the assumptions, uses, and limitations of each statistic discussed. PREREQUISITE: Education 7541 or consent of the instructor.

EDUCATIONAL PSYCHOLOGY (EDPS)

7111. Advanced Child Study. (3).

The interrelatedness of all phases of growth as it affects the elementary school child in the home, school, and society.

7112. Advanced Adolescent Study. (3). (6112)

A study of the various theories of adolescence and an analysis of current expressions of adolescent behavior as these have implications for secondary education.

7121. Educational Psychology. (3).

This is an advanced course in the psychology of teaching and learning designed especially for experienced teachers and administrators who desire to pursue graduate study in the field of education.

7131. Mental Hygiene and the School. (3). (6131)

Guidance for the teacher in working on her own personality development and a study of the mental hygiene of the child as affected by his total environment, past and present.

8121. Seminar in Problems of Classroom Learning. (3).

A course designed for the advanced graduate student in Education who is particularly interested in investigating problems of classroom learning, with special attention directed to the application of learning theories to classroom procedures. PREREQUISITE: Permission of instructor.

GEOGRAPHY

PROFESSOR PAUL HARDEMAN SISCO, *Chairman*

Room 115, Johnson Hall

In the department of Geography, graduate students who select Geography as a major area will consult their major adviser as to the program of study.

All graduate majors in the department of Geography must have credit for Geography 6111, 6121, and 7503 or their equivalents before being admitted to candidacy. In addition, before they receive the Master's Degree, they must complete either 7202 or 7212, 7461, and one of the seminar courses numbered 7603 through 7608. However, not more than two of the seminar courses numbered 7603 through 7608 may be counted toward the master's degree.

Majors will attempt a thesis only with the recommendation of the graduate school faculty in the department.

For the collateral area, nine semester hours as shown below:

- A. M.A. Degree requirements—nine semester hours as approved by the adviser, with a maximum of 3 semester hours in the earth sciences.
- B. M.S. Degree requirements—nine semester hours as approved by the adviser, with a minimum of six semester hours in the earth sciences.

6111. Earth Science I. The Atmosphere. (3).

An analytical study of the physical processes underlying the behavior and responses of the atmosphere and the application of this general body of knowledge to an understanding of the relationship of man to this important element of his environment.

6121. Earth Science II. The Earth. (3).

An analytical study of land forms, their changes and their uses to man.

6122. Earth Science III. The Soil. (3).

An analytical study of soils to include their physical, chemical, and biological qualities, and their classes, uses, and measures of conservation.

6131. Earth Science IV. The Oceans. (3).

An analytical study of the oceans to include their physical, chemical, and biological qualities; their movements, resources, climate influences, and their importance for transportation.

6304. Western Europe. (3).

A geographic analysis of the lands west of the Iron Curtain.

6305. The Soviet Realm. (3).

A regional analysis of the Soviet Union and its satellites.

6306. The Far East. (3).

A consideration of the significance of regional differences in Japan, China, and India, and a brief survey of the remaining areas.

6314. Geography of Mexico. (3).

A comprehensive and systematic survey of the geographical regions, resources, and potentialities of Mexico and the significance they have for Mexico in the economic and political affairs of Latin America and the world.

6315. Geography of Brazil. (3).

A comprehensive and systematic survey of the geographic regions, resources, and potentialities of Brazil and the significance they have for Brazil in the economic and political affairs of Latin America and the world.

6316. The South. (3).

A study of selected regions in the South with emphasis on changes and trends in the cultural-physical complex.

6317. Tennessee. (3).

A comparison of the human-use, political, and physical regions of the state.

6432. City Planning. (3).

The fundamental principles of urban planning, basic elements of a city plan, and the necessity of continuity in planning administration.

6433. Urban Renewal. (3).

Changing urban land uses, first in areas which must improve or rebuild obsolete patterns, functions, and forms; and second in areas with acceptable uses, structures, and institutions which in the interest and welfare of all the people must have additional space for growth and expansion.

6434. Urban Development. (3).

A study of urban systems and forces that affect change, including public and private investments needed for urban development.

6482. Urban Land Use Controls. (3).

Study of restrictions on land uses, including codes and ordinances governing zoning and subdivision. PREREQUISITE: Geography 4432.

6483. Planning Community Facilities. (3).

Planning and location and building of the community's public facilities. PREREQUISITE: Geography 4432.

6521. Quantitative Methods. (3).

An introduction to quantitative methods in geographic analysis. PREREQUISITE: Permission of the instructor.

†6611. Regional Field Study. (6).

A comparative study of selected regions of the world, including library study of the regions to be traversed, a minimum of sixteen days to study in the regions, and oral and written reports. PREREQUISITE: Permission of the instructor.

7123. Physiography of the Eastern United States. (3).

Systematic study of the evolution and distribution of landscape forms in the eastern United States. PREREQUISITE: One of the following courses: Geography 1102, 6121, or Geology 1101.

7124. Physiography of the Western United States. (3).

Systematic study of the evolution and distribution of landscape forms in the western United States. PREREQUISITE: One of the following courses: Geography 1102, 6121, or Geology 1101.

7202. Economic Geography: Agricultural. (3).

A survey of agricultural products and agricultural regions of the world, and the role of agriculture in world economy.

7212. Economic Geography: Industrial and Commercial. (3).

An examination of industrial and commercial location theory and the systematic analysis of the spatial distribution of selected industrial and commercial activities.

7403. Historical Geography of Latin America. (3).

A comprehensive investigation of the cultural and physical factors operative in the population movements and settlement patterns in Latin America during selected periods and in selected areas.

7422. Political Geography. (3).

The content and philosophy of political geography as illustrated by a broad survey of major writers in the field followed by student analysis of individual nation-states.

7436. Seminar in Urban Geography. (3).

An analysis of the spatial aspects of urban development.

7441. Population Geography. (3).

A survey of the density, distribution, migrations, trends, and settlement patterns of world population.

†7452. Introduction to Techniques of Research and Presentation. (3).

An analysis of the scholarly use of source materials and bibliographical aids for the effective presentation of research findings in oral and written form.

7453. Individual Research. (3).

Individual supervision under a member of the graduate faculty on a topic within the student's major field of interest.

7461. Development of Geographic Thought. (3).

A course vital in acquainting the serious minded geography student with the various types and sources of geographic literature, its nature and content, and the growth and development of geographic thought.

7471. Cultural Geography. (3).

A systematic analysis of the manner in which selected culture traits interact with other patterned phenomena to produce distinctive geographic landscapes. Individual student study on selected problems is an integral part of this course.

7503. Advanced Cartography. (3).

A study of the ways by which data are presented and interpreted through maps, charts, graphs, and tables.

7522. Advanced Quantitative Methods. (3).

The application of multivariate statistical models, special statistics, and computer techniques to modern geographic research problems. **PRE-REQUISITE:** Geography 4521 or the permission of the instructor.

7602. Seminar in Climatology. (3).

Systematic study of the classification and distribution of climates. **PRE-REQUISITES:** Geography 6111.

7603. Seminar in Africa. (3).

Regional and/or systematic analysis of selected areas in Africa.

7604. Seminar in Anglo-America. (3).

Regional and/or systematic analysis of selected areas in Anglo-America.

- 7605. Seminar in Latin America. (3).**
Regional and/or systematic analysis of selected areas in Latin America.
- 7606. Seminar in Europe. (3).**
Regional and/or systematic analysis of selected areas of Europe.
- 7607. Seminar in the Soviet Realm. (3).**
Regional and/or systematic analysis of selected areas in the Soviet Realm.
- 7608. Seminar on The Far East. (3).**
Regional and/or systematic analysis of selected areas in The Far East.
- 7609. Seminar in Historical Geography. (3).**
Individual and/or group analyses into the historical geography of either regions or topics.
- 7621. Special Problems. (1-3).**
(May be repeated for a maximum of 9 credits). Independent investigation of a research problem selected in consultation with the instructor.
- 7701. State Planning. (3).**
Comparative study of planning function in state government. PREREQUISITE: Geography 4432 and 7702.
- 7702. Regional Planning. (3).**
A study of regional planning organization, the various levels of planning, the functions and aspects of plan implementation. PREREQUISITE: Geography 4432.
- †7996. Thesis. (3-6).**
A student registering for this course must have demonstrated, to two or more members of the geography staff, superior ability in the field of geographic content and in the organization and presentation of subject matter. Application for writing a thesis must be filled out on an approved form after consultation with the major professor and filed with the Dean of The Graduate School at the time of registration.
PREREQUISITE: Approval of supervising teacher and department chairman.

†Grades of S, U, or IP will be given.

GEOLOGY

PROFESSOR ANTHONY CARIANI, *Chairman*

Room 312, Engineering Building

In the division of Geology, graduate students who select Geology as a major area will consult their major adviser as to the program of study; however, Geology 7996 is required of all those who major in Geology.

6121. Optical Crystallography. (4).

The principles and methods of study of optical crystallography. The use of the polarizing microscope in the identification of minerals by the immersion method. PREREQUISITE: Consent of instructor.

Two lecture, four laboratory hours per week.

6202. Geomorphology. (4).

The origin and characteristics of land forms and physiographic provinces based on a consideration of geologic processes and geologic structure. Descriptive and basic quantitative approaches to the effects of weathering, mass-wasting, fluvial, glacial, wind and marine processes on the earth's surface. Laboratory study of maps and aerial photographs. PREREQUISITE: Consent of instructor.

6301. Geostatistics. (3).

Application of statistical techniques to selected geological problems. Hypothesis testing, regression, correlation, time trend analysis, curve fitting, Markov chains, etc. A problem oriented course. PREREQUISITE(S): Senior standing in geology or consent of the instructor.

6312. Introduction to X-ray Diffraction. (3).

The basic principles of the x-ray diffraction. Its application to crystallographic and mineralogic problems including mineral identification by the powder method. PREREQUISITE: Permission of the instructor.

6322. Microscopic Petrography. (4).

Classification, description, and thin-section study of rocks by means of the petrographic microscope. PREREQUISITE: Geology 6121.

Two lecture, four laboratory hours per week.

6332. Introduction to Geochemistry. (3).

Study of the geological and chemical processes which govern or control the migration and distribution of the elements and atomic species in the earth in space and time. PREREQUISITE: Consent of instructor.

Three lecture hours per week

6411. Micropaleontology. (3).

A study of microscopic fossils. Morphology, classification, evolution, and stratigraphic distribution of some of the more common groups. Photomicrography and laboratory techniques in preparing micro-fossils for study. PREREQUISITE: Consent of instructor.

Six laboratory hours per week.

6421. Stratigraphic Paleontology and Paleocology. (3).

Concepts and methods of biostratigraphy and paleocology. The importance of ancient organisms as contributors to sedimentation, indicators of environment, and guides to correlation of strata. PREREQUISITE: Geology 3712.

6511. Economic Mineral Deposits. (3).

Origin, occurrence, and composition of metallic and non-metallic mineral deposits. PREREQUISITE: Geology 2312 and 2512 (Mineralogy).

Three lecture hours per week.

6601. Engineering Geology. (3).

The application of the principles and knowledge of geology to engineering practice, especially in highway construction, dam sites, foundations, water resources and location of certain engineering materials. PREREQUISITE: Consent of instructor.

6632. Applied Geophysics. (4).

A survey of geophysical methods that emphasizes seismic and electrical investigations employed in engineering practice. The use of resistivity and seismograph in the investigation of subsurface materials, the location of sand, gravel and subsurface water are discussed and will be supplemented by field measurements with these instruments.

6701. Spring Field Trip. (1-2).

Conducted field trip to Ouachita-Arbuckle-Wichita mountains of Oklahoma during spring vacation. About 30 hours of field work will follow 2-4 hours of lectures. Open to non-majors. PREREQUISITE: Consent of instructor.

6702. Spring Field Trip. (1-2).

Conducted field trip to Ouachita, Ozark dome and adjacent mineral districts during spring vacation. About 30 hours of field work will follow 2 to 4 hours of lectures. Open to non-majors. PREREQUISITE: Consent of instructor.

6703. Spring Field Trip. (1-2).

Conducted field trip to central and southern Appalachians during spring vacation. About 30 hours of field work will follow 2 to 4 hours of lectures. Open to non-majors. PREREQUISITE: Consent of instructor.

6704. Spring Field Trip. (1-2).

Conducted field trip to the Gulf Coastal Plain during spring vacation. About 30 hours of field work will follow 2 to 4 hours lectures. Open to non-majors. PREREQUISITE: Consent of instructor.

6705. Spring Field Trip. (1-2).

Conducted field trip to the Upper Mississippi Valley and Lake Superior District during spring vacation. About 30 hours of field work will follow 2 to 4 hours of lectures. Open to non-majors. PREREQUISITE: Consent of instructor.

7101. Geological Instrumentation. (2).

Use of instrumentation in the geology department. Instrument use, care, and safety. Sample preparation, interpretation of results. PREREQUISITE: Consent of instructor.

One lecture, two laboratory hours per week.

7311. Advanced Physical Geology. (3).

Development of the earth with emphasis on the pros and cons of the New Global Tectonics and Continental Drift. Plots the relationship between diverse aspects such as volcanism, climate, continent and sea floor topography, earthquakes, etc.

Three lecture hours per week.

7312. Advanced Historical Geology. (3).

Geotectonic development, stratigraphic and life history of the North American continent with special emphasis on the United States. PREREQUISITE: Consent of instructor.

Three lecture hours per week.

7321. X-Ray Diffraction Techniques. (3).

The application of x-ray diffraction techniques to crystallographic problems. PREREQUISITE: Consent of instructor.

One lecture, four laboratory hours per week

7331. Advanced Geochemistry. (3).

Study of selected topics, particularly mineral phase equilibria, geochronology, trace element and isotope distribution. PREREQUISITE: Geology 6332 or consent of instructor.

Three lecture hours per week

7340. Clay Mineralogy. (3).

The origin, occurrence and properties of well-crystallized and fine-grained layer silicates and related minerals are discussed in terms of their chemical and structural variations. PREREQUISITE: Consent of instructor.

7352. Sedimentary Petrology. (4).

Examination of sedimentary rocks in the field, in hand specimen, and through the microscope with the view of explaining sedimentary rock classification, the post depositional changes that occur in sediments and the bearing of these factors on geology as a whole. PREREQUISITE: Consent of instructor.

†7360. Advanced Study in Mineralogy and Crystallography. (1-4).

Directed laboratory or field research project selected in consultation with instructor. Report required. Hours and credits to be arranged.

†7370. Advanced Study in Petrology. (1-4).

Directed laboratory or field research project selected in consultation with instructor. Report required. Hours and credits to be arranged.

7411. Advanced Micropaleontology. (3).

Taxonomy, morphology, ecology and stratigraphic distribution of microorganisms with emphasis on the Foraminifera and the Ostracoda. PREREQUISITE: Geology 6411 or consent of instructor.

Six laboratory hours per week.

7421. Stratigraphic Paleontology. (3).

Discussion of paleoecologic and biostratigraphic principles and ideas. PREREQUISITE: Consent of instructor.

Three lecture hours per week

†7440. Advanced Study in Paleontology. (1-4).

Directed laboratory or field research project selected in consultation with instructor. Report required. Hours and credits to be arranged.

†7510. Advanced Study in Geotectonics. (1-4).

Directed laboratory or field research project selected in consultation with instructor. Report required. Hours and credits to be arranged.

7551. Mineralography. (3).

Identification of ore minerals in polished sections by microchemical tests under the ore microscope. Interpretation of the textural relations and the determination of paragenesis. PREREQUISITE: Consent of instructor.

Six laboratory hours per week.

7631. Seminar in Geology. (1).**7641. Seminar in Geology. (1).****7651. Seminar in Geology. (1).****7661. Seminar in Geology. (1).****†7996. Thesis. (6).**

The following courses are open *ONLY* to graduate students who are enrolled in the Master of Science in Teaching program. The courses offered will provide an adequate background for teaching geology at the secondary level.

7011. Earth Materials — Minerals and Rocks. (3).

The composition and physical properties of the materials which make up the solid earth. The identification and classification of simple rock types and the important minerals which make up the common rocks.

Two lecture, two laboratory hours per week.

7022. Geotectonics. (3).

Study of the structural framework of the earth. The form and arrangement of the rock masses which make up the crust of the earth.

Three lecture hours per week.

7031. Principles of Historical Geology. (3).

A study of the methods of interpreting earth history from the sedimentologic and paleontologic record, and a review of the geological and biological events which have led to the present distribution and configuration of continents and oceans, and the form and distribution of life.

Two lecture, two laboratory hours per week

7041. Geomorphology for Teachers. (3).

Interpretation and origin of the earth's relief features. Geomorphic processes. The fluvial cycle and its landforms. Landforms developed by glaciation, the wind and volcanic activity. Geomorphic features in limestone areas and folded and faulted areas. Physiographic provinces of the United States.

7061. Earth Science Seminar for Teachers. (2).

†Grades of S, U, or IP will be given.

GUIDANCE AND PERSONNEL SERVICES

PROFESSOR ROBERT E. DAVIS, *Chairman*

Room 106A, Guidance and Personnel Services Building

The Department of Guidance and Personnel Services offers degrees at the Master's, Specialist, and Doctoral levels. Majors at the Master's level include the M.Ed., Guidance and Personnel Services (Elementary School Counseling and Guidance); M.Ed., Guidance and Personnel Services (Secondary School Counseling and Guidance); M.Ed., Guidance and Personnel Services (General Counseling and Guidance). At the Specialist's level, the department offers the Ed.S. in Personnel Services. (Student Personnel Services).

- A. Master of Education — Guidance and Personnel Services (Elementary School Counseling and Guidance). Courses Required: EDFD 7521, EDPS 7121, GUID 7611*, 7631, 7651, 7661, 7681, 7692. The student will be required to take 9 semester hours outside the College of Education in a supporting field. If the course work for the student's teaching endorsement area, excluding elementary education, (Home Economics, Physical Education, Special Education, etc.) is offered in the College of Education, the 9 hours may be taken within the College. Minimum total: 33 semester hours.
- B. Master of Education — Guidance and Personnel Services (Secondary School Counseling and Guidance). Courses Required: EDFD 7521, EDPS 7121, GUID 7611*, 7631, 7651, 7661, 7681, 7691. The student will be required to take 9 semester hours outside the College of Education in a supporting field or in his teaching endorsement areas. If the course work for the student's teaching endorsement areas, excluding elementary education, (Home Economics, Physical Education, Special Education, etc.) is offered in the College of Education, the 9 hours may be taken within the College. Minimum total: 33 semester hours.
- C. Master of Education — Guidance and Personnel Services ** (General Counseling and Guidance). Candidates for this degree must meet the following prerequisites: A minimum of 6 semester hours in upper division undergraduate or graduate courses in educational, psychological, sociological, or philosophical foundations. The general Counseling and Guidance degree is a service degree, designed for employment counselors, ministers, college student personnel workers, and others outside the field of elementary or secondary education. Courses required: EDFD 7521, GUID 7611*, 7631, 7651, 7661, 7681, two additional guidance courses, and 9 semester hours outside the College of Education in supporting courses. Minimum total: 33 semester hours, excluding prerequisites.
- D. Education Specialist — Personnel Services (Counseling and Guidance) — Requirements: 36 semester hours in the major concentration, 9 semester hours of collateral work in the College of Education, EDFD 7521, 7541, and ***15 semester hours of supportive work outside the College of Education. Any area approved for graduate study will be acceptable for collateral work, so long as it contributes to the student's program. No area will be acceptable unless it meets with the approval of the candidates committee. Additional information pertaining to specific course requirements in the major and collateral areas may be secured from the Department of Guidance and Personnel Services. Minimum total: 66 semester hours of graduate credit with a minimum of 9 semester hours selected from courses numbered 8000 or above.
- E. Doctor of Education — Personnel Services (Student Personnel Services) — Requirements: 48 semester hours in the major concentration, 15 semester hours of collateral work in the College of Education, EDUC 8950, EDFD 7521, 7541, and 8521 or 8542, one additional course in Foundations of Education and ***21 semester hours of supportive work outside the College of Education. Any area approved for graduate study will be acceptable for collateral work, so long as it contributes to the student's program. No area will be acceptable

unless it meets with the approval of the candidate's committee. Additional information pertaining to specific course requirements in the major and collateral areas may be secured from the Department of Guidance and Personnel Services. Minimum total: 99 semester hours of graduate credit with a minimum of 21 semester hours selected from courses numbered 8000 or above.

*Not required if an equivalent course was taken at the undergraduate level. (Substitutions must be approved by the advisor).

**NCATE does not accredit programs for non-certificated personnel nor programs in higher education.

***If the course work for the student's teaching endorsement area, excluding elementary education, (Home Economics, Physical Education, etc.) is offered in the College of Education, this work may be taken within the College of Education.

GUIDANCE AND PERSONNEL SERVICES (GUID)

†6691. **Practicum in Residence Hall Staff Counseling and Advising. (3).**

Practical experience for residence hall staff. Instruction and supervision will be provided. The practicum deals with individual and group activities in counseling, advising, communication, and leadership. Concerns such as drug abuse, Family Planning information, and student discipline will be considered. It utilizes interdepartmental disciplines. *Only Pass-Fail grades will be given.*

7611. **Procedures, Administration, and Organization of Guidance Services in Schools. (3).**

(6611)

Historical background and growth of the guidance movement; sociological, psychological, and educational foundations; functions, scope, organization and administration of guidance services; duties and responsibilities of administrators, and specialists in guidance programs.

7621. **Guidance and Counseling in the Elementary School. (3).**

An analysis of social, emotional, and educational problems in the development of the elementary school child, with emphasis on guidance approaches for preventing these problems and helping children resolve their conflicts as they occur.

7631. **The Group Process as Applied to Guidance. (3).**

This course is a study of the group process as applied to the role of teachers and counselors in Guidance. It includes homeroom and group guidance procedures, and the counselor's function in working effectively with students, administrators, and teachers in the school.

7651. **Diagnostic Techniques in Guidance. (3).** (formerly Diagnostic Techniques)

Analysis and use of the diagnostic techniques basic to school guidance and counseling. How to select, use, and interpret devices for gathering data about students; how to assemble and interpret data from cumulative records and case histories.

7661. **Educational and Occupational Information. (3).**

This course is concerned with needs, trends, training facilities, and vocational opportunities. Emphasis will be placed on gathering, interpreting, and using all types of educational, social, occupational, and community information in the guidance program.

7681. Theories of Counseling. (3).

This course includes a consideration of different schools of thought in counseling; how the school counselor works. Effective procedures for interviewing and counseling students including implications for school social work.

**†7691. Supervised Practicum in Guidance and Counseling in the Secondary School. (3).
(formerly Supervised Practicum School Guidance and Counseling)**

Supervised application of the principles and methods of guidance derived from professional preparation for school counselors; standardized tests, records and personal data, educational and occupational information, personal and group counseling and interview techniques. Minimum: 135 clock hours. PREREQUISITE: Consent of instructor.

†7692. Supervised Practicum in Guidance and Counseling in the Elementary School. (3).

Supervised application of the principles and methods of guidance derived from professional preparation for school counselors; standardized tests, records and personal data, educational and occupational information, personal and group counseling and interview techniques. Minimum: 135 clock hours. PREREQUISITE: Consent of instructor.

7771. Workshop in the Administration of Guidance Services. (1-3). (6771)

This course is designed primarily to assist in-service and prospective teachers and administrators in providing more effective guidance services in grades one through twelve. Services to be considered may be grouped as follows: inventory, information, counseling, placement, and follow-up. Particular attention will be given to planning, organizing, and evaluating these services.

7993. Special Problems in Guidance. (1-3).

Individual investigation and report in the area of guidance under the direction of a faculty member.

†7996. Thesis. (3-6).

Only students with superior scholarship are permitted to register in this course. The student must present in writing an outline describing the proposed thesis. This outline, when approved by the faculty members, is submitted to the Chairman of the Department of Secondary Education for his approval. This course will involve writing the thesis and will emphasize the adequate setup of the problem, the collection of the data, their use, and conclusions to be reached.

Application for writing a thesis must be filled out on an approved form after consultation with the major professor, and filed with the Dean of The Graduate School at the time of registration.

†8000. Education Specialist Thesis. (3-6).

Individual study of a research problem, closely related to the student's field of major concentration.

8001. Education Specialist Field Study. (3-6).

Individual study of a significant problem in a local school system. The study shall be closely related to the student's field of major concentration.

8611. Student Personnel Services in Higher Education. (3).

This course will analyze the activities, functions, relationships, and philosophy of the Dean of Students, Dean of Men, Dean of Women and the Directors of housing activities, scholarship and loans, admissions and records, health services, and the counseling center.

8621. Guidance for the Student With Special Characteristics. (3).

Characteristics of the culturally deprived, the gifted, and the underachieving student will be discussed. The course will emphasize approaches and problems of assisting these students in emotional development and in educational and vocational planning. A project with students in one of the above classifications will be required. **PREREQUISITE:** Fifteen semester hours of credit in guidance and personnel services or consent of the instructor.

8631. Advanced Group Processes for Counselors. (3).

Advanced study of group processes as applied to counseling, guidance, and student personnel work. Activities, functions, and dynamics of groups will be studied. Actual experience with group work will be included in the course. **PREREQUISITE:** Fifteen semester hours of credit in guidance and personnel services or consent of the instructor.

8671. Operation of Guidance and Personnel Services. (3).

This course will consider the problems of the guidance or personnel services staff member who is responsible for administering the program. Attention will be given to the services themselves and to the principles, techniques, planning, organizing, staffing, directing, and budgeting of these services. **PREREQUISITE:** Fifteen semester hours of credit in guidance and personnel services or consent of the instructor.

8672. Seminar in Counseling and Guidance. (1-3).

A seminar devoted to current concerns and methodology in guidance and counseling. Course may be repeated for a maximum of nine semester hours credit. **PREREQUISITES:** Fifteen semester hours of credit in guidance and personnel services or consent of the instructor.

8681. Seminar in Counseling and Personnel Services Research. (3).

This course is designed to give the advanced graduate student in guidance and personnel services the opportunity to explore present research and research methodology in areas of current importance and personal interest and to begin to carry out research of his own. **PREREQUISITE:** Fifteen semester hours of credit in guidance and personnel services or consent of the instructor.

†8691. Advanced Practicum in Counseling. (3).

The advanced practicum in counseling is designed to increase the competency of practicing counselors. Course work will consist of critical analysis of actual counseling interviews, including both individual and group sessions. Various methods will be employed for recording and observing counseling sessions, such as audio and/or video tapes and one-way vision screens. Counseling attitudes, techniques, and ethics will be considered. **PREREQUISITE:** GUID 7691, 7692, or appropriate counseling experience.

8692. Seminar in Student Personnel Services (Higher Education). (3).

Designed for students planning to enter the field of student services in higher education, this seminar course utilizes the expertise of the student personnel staff and covers the functions of the student personnel division. **PREREQUISITE:** Must be taken as a prerequisite to GUID 8693.

†8693. Supervised Practicum in Student Personnel Services in Higher Education. (3-6).

Supervised experiences in one or more of the following areas: residence halls, activities, admissions, records, organizations, financial aids, and administration. A seminar will be included. **PREREQUISITE:** Fifteen semester hours of credit in guidance and personnel services or consent of the instructor. Course may be repeated for a maximum of 9 semester hours.

†9000. Doctoral Dissertation. (3-12).

Credit may be earned over a period of several semesters. The dissertation may be an organized scientific contribution or a comprehensive analysis of theory and practice in a specific area.

†Grades of S, U, or IP Will be given.

HEALTH, PHYSICAL EDUCATION, AND RECREATION

PROFESSOR RALPH L. HATLEY, *Chairman*

Room 211, Field House

In the Department of Health, Physical Education, and Recreation, graduate students may place a major emphasis in the areas of Health, or Physical Education, or Recreation. Requirements: A total of 33 semester hours is needed for graduation, of which 21-24 semester hours are required for the major and 9 to 12 hours in the collateral area. The required 21 semester hours for each major emphasis area are as follows:

Health — HLTH 6602, 6702, 7142, 7162, 7702, 7802, PHED 7204.

Physical Education — PHED 7103, 7123, 7163, 7204, 7404, and electives (6 semester hours).

*Recreation — RECR 6405 or 7505, 7145, 7305, 7405, and PHED 7204 and electives (6 semester hours).

The successful completion of an oral and/or written examination is required. Minimum state teacher certification requirements must be met either prior to or during the period of regular graduate work in either Health or Physical Education. In the areas of Recreation and Health *(non-teaching), certification does not apply. Prior to admission to non-certificated programs, the student must complete at least 6 semester hours in upper division undergraduate or graduate courses in psychological, historical, social or philosophical foundations. For the collateral area, 9 semester hours must be selected outside the College of Education.

*NCATE does not accredit programs for non-certificated personnel.

HEALTH (HLTH)

The prefix used by the department of Health, Physical Education, and Recreation for courses in Health is HLTH.

6302. Observation in Community Agencies. (3).

This course is planned to introduce the student to a wide variety of community health and welfare agencies. Opportunity to visit in official and volunteer agencies is provided. Purpose, objectives, functions and programs are presented by representatives in each agency. Application for the course should be made at least 60 days before the student desires to enroll in the course. PREREQUISITE: Permission of Chairman of Department.

6602. Organization and Administration in Health. (3).

A study of the basic functions, principles and procedures of organization and administration as applied to health. Emphasis is placed on the relationship and responsibilities of personnel in planning, promoting, and improving and evaluating the total health activities in the family-centered health services. Legal and legislative aspects of health activities are included.

6702. Trends and Problems in Public Health. (3).

A review of the historical development and current trends in community health; the various needs and demands for medical care; the contribution of the professional personnel in providing for total health services and education.

7142. Seminar in Health. (1 to 3).

(May be repeated for a maximum of 9 credits). Special study of selected current problems in this area. For the most part, individual studies will be pursued with group analysis and discussion at regular class meetings. **PREREQUISITE:** Consent of instructor.

7152. Special Problems in Health Education. (1 to 3).

This course is designed to afford opportunity for prospective or in-service school and professional personnel to work individually or in groups in carrying out a research project.

7162. Curriculum Construction in Health. (3).

Designed to explore factors involved in attaining a sound curriculum, to use the conceptual approach in curriculum development, to recognize curriculum problems, and to develop criteria for evaluating programs.

7702. Sociological Health Issues. (3).

This course focuses on the most critical health issues facing our nation today, namely: alcohol, tobacco, drugs, venereal disease, sex education, cancer, heart disease, mental illness, etc. Stress is placed on the role of the parent, teacher, administrator, and community in relation to these problems. Lectures are presented by authorities in each of the critical areas selected for study.

7802. Construction and Analysis of Health Tests. (3).

The principles of construction, selection, and analysis of teacher made written achievement tests in the field of health education will be presented. The availability, selection, and analysis of standardized tests in these areas will also be discussed. A project is required to apply the principles involved.

†7996. Thesis. (3-6).

Application for writing a thesis must be filled out on an approved form after consultation with the major processor and filed with the Dean of The Graduate School.

PHYSICAL EDUCATION (PHED)

The prefix used by the department of Health, Physical Education, and Recreation for courses in Physical Education is PHED.

6204. Test and Measurements in Health and Physical Education. (3).

A study of the various tests in the field of health and physical education, including uses and interpretation of elementary statistical techniques.

6403. Supervised Clinical Training in Corrective Therapy. (6).

Supervised clinical practice in the Department of Physical Medicine and Rehabilitation Service at the Kennedy V. A. Hospital. Instruction will be given in the conditioning, ambulation and self-care of patients with neurological, pulmonary, geriatric, neuropsychiatric, speech, blind, spinal cord injuries, cardiac, and other types of disabilities.

7103. Foundations of Physical Education. (3).

The interpretation of the objectives of physical education as related to scientific facts contained within the biological, psychological, and sociological fields of study.

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7123. Mechanical Analysis of Motor Skills. (3).

The student is provided with experiences which will enhance the understanding and practical application of the laws of mechanical physics to the fundamental techniques utilized in the performance of physical activities. Learning activities will include use of various texts, class discussion, problem solving, and cinematography.

7124. Curriculum Construction in Physical Education. (3).

Consideration is given to the entire program of instruction in physical education in the public schools; methods of instruction, standards of achievement, evaluation of results, and the preparation of a course of study.

7132. Current Readings in Health, Physical Education, and Recreation. (3).

Directed independent reading in the areas of Health, Physical Education, and Recreation. Materials selected to strengthen deficient areas of study. PREREQUISITE: Consent of instructor.

7134. Supervision of Health and Physical Education. (3).

The purpose of this course is to present and discuss the duties and problems of the supervisor of health and physical education in the school and community.

7143. Seminar in Physical Education. (1 to 3).

(May be repeated for maximum of 9 credits). Special study of selected current problems in this area. For the most part, individual studies will be pursued with group analysis and discussion at regular class meetings. PREREQUISITE: Consent of instructor.

7144. Development and Supervision of an Elementary School Health and Physical Education Program. (3).

Consideration is given to the entire program of instruction in health education and physical education in the elementary schools; methods of instruction, standards of achievement, organization and supervision of the program. (Intended for elementary school teachers as well as principals and supervisors).

7153. Special Problems in Physical Education. (1 to 3).

This course is designed to afford opportunity for prospective or in-service school and professional personnel to work individually or in groups in carrying out a research project.

7163. Motor Learning. (3).

An investigation of research as it relates specifically to the acquisition of motor skills. Emphasis is placed upon such variables affecting skill acquisition as: motivation; distribution, length and method of practice; feedback mechanisms; and the retention and transfer of skills:

7204. Introduction to Research in Health and Physical Education. (3).

A study is made of the various methods and techniques of research. A potential problem is selected, analyzed and written according to research standards.

7404. Measurement and Evaluation in Health and Physical Education. (3).

This course includes selection, application and evaluation of certain tests appropriate to these areas.

7603. The Administration of Athletics. (3).

For athletic directors, supervisors, athletic coaches and principals. A study of representative athletic administrative procedures for colleges, public school systems, and municipal athletic leagues. Fiscal procedures and business management are stressed.

†7996. **Thesis. (3-6).**

Application for writing a thesis must be filled out on an approved form after consultation with the major professor and filed with the Dean of The Graduate School.

RECREATION (RECR)

The prefix used by the department of Health, Physical Education, and Recreation for courses in Recreation is RECR.

6205. Supervised Clinical Training in Recreation Therapy. (6).

Supervised clinical training in the Recreational Therapy Department of the Physical Medicine and Rehabilitation Service at the Memphis V. A. Hospital. Instruction will be given in arts and crafts, radio, television programming, social activities, adapted sports, music, allied ward and clinic activities for patients and varied illnesses and disabilities.

7505. Park Administration and Supervision. (3).

Administration, management, and operational principles, techniques and procedures related to park areas, facilities and personnel.

6405. Organization and Administration of Recreation. (3).

An understanding of community organization, its philosophy, foundation and principles. An understanding of selected administrative practices that relate to successful recreational organization and administration.

6705. Workshop in Recreation. (1-6).

Materials and experiences planned especially for in-service and continuing education for professional recreation and park personnel or in-depth specialization for majors in recreation. PREREQUISITE: Consent of Instructor.

7145. Seminar in Recreation. (1 to 3).

(May be repeated for maximum of 9 credits). Special study of selected current problems in this area. For the most part, individual studies will be pursued with group analysis and discussion at regular class meetings. PREREQUISITE: Consent of instructor.

7155. Special Problems in Recreation. (1-3).

This course is designed to afford opportunity for prospective or in-service professional personnel to conduct independent or group research in the field of recreation and parks. PREREQUISITE: Consent of instructor.

7305. Philosophy of Leisure and Recreation. (3).

A study of the philosophical foundations for recreation in a dynamic society and in an age of leisure.

7405. Program Planning in Recreation. (3).

A study of the needs, interests, and problems of people with specific reference to age. A study of social forces affecting recreational planning and programming. Development of an understanding of the principles of program planning, development, and management, including organization, direction, and supervision.

7415. Recreation in Special Settings. (2).

Course content will focus on varied current problem settings (i.e., urban, inner city, rural and industrial recreation). PREREQUISITE: Recr 7305 or Consent of Instructor.

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7605. Supervised Practicum in Recreation. (3-9).

Field experience of an internship nature providing an opportunity for practical application of classroom theory. A range between 140 and 420 clock hours in professional field work in selected recreational settings according to student's particular area of emphasis. No more than six semester hours may apply to a 30 or 33 semester hours degree program. If nine hours is earned, the student must present not less than 36 hours for a non-thesis degree.

†7996. Thesis. (3-6).

Application for writing a thesis must be filled out on an approved form after consultation with the major professor and filed with the Dean of The Graduate School.

†Grades of S, U, or IP will be given.

HISTORY

PROFESSOR AARON M. BOOM, *Chairman*

Room 100, Mitchell Hall

The Department of History offers a program of study leading to the M. A. degree. The basic provisions of the program are as follows:

Prerequisites: A minimum of 18 semester hours in undergraduate history, except in special cases approved by the Dean of The Graduate School and the Chairman of the Department of History.

Requirements: (1) A total of 33 semester hours for the student who elects not to write a thesis; (2) A total of 30 semester hours for the student who elects to write a thesis; (3) No more than 21 semester hours may be taken in one field (United States, Europe, Latin America), including the 6 hours of thesis credit; (4) A minimum of 18 hours of 7000 level courses, of which 15 hours must be in history; (5) A maximum of 6 hours may be taken in a field outside history; (6) History 7000 must be completed by each student; (7) A comprehensive examination over course work, with a follow-up examination at the option of the examining committee; (8) Thesis approval by a departmental committee headed by the faculty member who directed the preparation of the thesis.

Advising: When the student enters the program he will consult with a departmental adviser about the particular course of study best suited to his background and needs.

The Department of History also offers a program of study leading to a Ph.D. degree.

The program is designed to assure a broad knowledge in two fields of history, more specialized and in-depth knowledge in another field, and professional competence in original research and writing. A minimum of three academic years beyond the B.A. degree is needed to complete the program. The basic provisions are as follows:

Admission: Formal permission for the student to enter the program will be granted by the Graduate Studies Committee. The student is encouraged to apply by the time he has completed 12 hours of course work beyond the M.A. degree or its equivalent. The student must: (1) Present three letters of recommendation from persons acquainted with his previous work; (2) Possess a grade point of 2.8 (on a 4.00 scale) for the last 60 hours of undergraduate work and a 3.00 on all history courses and previous graduate work; (3) Make satisfactory scores on the General Aptitude and History parts of the Graduate Record Examination; (4) Make a satisfactory performance on a Qualifying Examination; given over his past work in history.

General Requirements:

- (1) **Resident.** The student must be enrolled for two successive semesters (exclusive of summer sessions) in full-time course work beyond the M.A. degree or its equivalent.
- (2) **Language.** As a general rule the student must demonstrate, by means of a standardized test, reading proficiency in two foreign languages. In some cases exception to one of the languages may be made.
- (3) **Fields of Study.** The student will choose one major field (Europe since 1789 or United States) and two minor fields (Ancient, Medieval-Renaissance, Europe since 1789, United States, British, Latin America).
- (4) **Course Requirements.** The student must enroll for approximately 30 hours of course work beyond the B.A. degree in his major field and for approximately 15 hours in each of his minor fields. Among these hours must be History 7000, History 7011, and 12 hours of research seminars.

- (5) Comprehensive Examination. The student will take a two-day written examination over the course work in his major field and a one-day examination over the course work in each of his minor fields. The student may take over one time any part of the examination failed. At its option the examining committee may schedule a follow-up oral examination.
- (6) Dissertation. Defense of the dissertation, prepared under the direction of a faculty member in the student's major field, will be by oral examination, and formal approval of it will be made by a majority vote of the examining committee.

Advising: When the student first enrolls for course work in the History Department, he will consult with a departmental adviser. After he has been formally admitted into the Ph.D. program, a Permanent Advisory Committee will be established to supervise the remainder of his work.

6126. Victorian England, 1840-1900. (3).

Reading and discussion on selected topics such as the development of English liberal thought, Victorian society and values, and imperialism.

6145. History of Modern Germany. (3).

A study of Germany from the origins of the unification movement in the Napoleonic Era through the Second World War.

6160. History of Russia to 1801. (3).

A study of the political, economic, social and cultural development of Russia from early times to the beginning of the nineteenth century.

6161. History of Russia from 1801 to 1917. (3).

A study of the political, economic, cultural, and intellectual development of the Russian Empire from the reign of Alexander I to the Bolshevik Revolution of 1917.

6162. History of the Soviet Union. (3).

A detailed study of the 1917 Revolution and the major developments in government, economy, cultural and social life, and international affairs which followed.

6240. History of Mexico. (3).

A survey of the political, economic, social, and cultural development of Mexico from ancient times to the present.

6250. History of Brazil. (3).

A survey of the political, economic, social, and cultural development of Brazil from early times to the present.

6371. Early Middle Ages. (3).

A study of the Late Roman Empire, the migration period, the emergence of Islamic, Byzantine, and West European cultures through the period of the Investiture Controversy. NOTE: Students who have received credit for History 6370 will not be allowed credit for History 6371.

6372. High Middle Ages. (3).

A study of the urban emergence, the growth of feudal monarchy, the foundations of modern political institutions, the medieval universities, and the intellectual fabric of scholasticism. NOTE: Students who have received credit for History 6370 will not be allowed credit for History 6371.

6380. The Renaissance World. (3).

A study of the achievements and forces, political and economic, social and cultural, creative and intellectual, which made up the foundation of modern European civilization.

6390. Europe in the Age of the Reformation. (3).

A consideration of the religious struggles, the social and intellectual milieu in the sixteenth and early seventeenth centuries.

6401. Europe in the Age of the Baroque. (3).

A study of the political crises, the development of monarchical absolutism, the rise of modern science, and the cultural synthesis in the seventeenth century.

6402. The Age of the Enlightenment. (3).

A study of intellectual, cultural, social, and political developments in eighteenth-century Europe.

6440. The Era of the French Revolution. (3).

A study of the Enlightenment, the French Revolution, and the Napoleonic era.

6451. Europe, 1815-1870. (3).

A study of Europe during the period 1815-1870.

6452. Europe, 1870-1914. (3).

A study of Europe during the period 1870-1914.

6461. Europe, 1914-1939. (3).

A study of Europe during the period 1914-1939.

6462. Europe, 1939-present. (3).

A study of Europe since 1939.

6501. Intellectual History of Europe I. (3).

Topics in the history of European thought and culture from the thirteenth through the seventeenth century.

6502. Intellectual History of Europe II. (3).

Topics in the history of European thought and culture from the eighteenth century to the present.

6620. Colonial America, 1607-1763. (3).

A study primarily of the political development and institutions of the English Colonies in America before 1763, with some attention given to Spanish, French, and Dutch colonization.

6630. Era of the American Revolution, 1763-1790. (3).

A study of the origins and conduct of the American Revolution, the United States under the Articles of Confederation, and the writing and ratification of the Constitution.

6641. The Early American Republic, 1790-1825. (3).

A study of American history from unification until 1825.

6642. The Jacksonian Period, 1825-1850. (3).

A study of American history from 1825 to 1850.

- 6660. Civil War, 1850-1865. (3).**
A study of division and conflict.
- 6670. Reconstruction, 1865-1877. (3).**
A study of national and sectional issues following the Civil War.
- 6680. Emergence of Modern America, 1877-1914. (3).**
A study of the United States from the end of Reconstruction to the outbreak of World War I.
- 6701. The United States, 1914 to the Second World War. (3).**
A study of the United States from the outbreak of World War I. NOTE: Students who have received credit for History 6700 will not be allowed credit for History 6701.
- 6702. The United States, from the Second World War. (3).**
A study of the United States from World War II to the present. NOTE: Students who have received credit for History 6700 will not be allowed credit for History 6702.
- 6881. American Negro History. (3).**
A survey of the role of the Negro in America from Jamestown to the present.
- 6941. History of the American Indian. (3).**
A study of the role of the Indian in American History.
- 7000. Introduction to Historical Research and Writing. (3).**
A study of the mechanical techniques of historical composition, the nature and use of various kinds of historical source materials, bibliographical aids, and methods of historical synthesis. Required of all history majors.
- 7011. History and Philosophy of History. (3).**
A survey of the history of historical writing, the speculative philosophies of history, and the problems involved in the critical philosophy of history.
- 7012. Directed Readings. (3-12).**
Arranged on an individual basis. Master's candidates may take the course for 3 hours credit. May be repeated for a total of 12 hours credit by students admitted to doctoral program.
- 7070. Research Seminars. (1-3).**
Emphasis on original research and writing in topics drawn from the fields generally covered by the Studies courses. May be repeated for credit with departmental approval. PREREQUISITE: History 7000.
- 7121. Studies in Tudor England. (3).**
Readings and reports to survey the important literature on the period.
- 7122. Studies in Stuart England. (3).**
Readings and reports to survey the important literature on the period.
- 7123. Studies in English History, 1714-1867. (3).**
Readings and reports to survey the important literature on the period.
- 7124. Studies in England Since 1867. (3).**
Readings and reports to survey the important literature on the period.
- 7211. Studies in Colonial Spanish America. (3).**
Readings and reports to survey the important literature on the period.

- 7212. Studies in the National Period of Latin America. (3).**
Readings and reports to survey the important literature on the period.
- 7320. Studies in Ancient History. (3).**
Readings and reports to survey the important literature on the period.
- 7376. Studies in the Middle Ages. (3).**
Readings and reports to survey the important literature on the period.
- 7380. Studies in the Renaissance. (3).**
Readings and reports to survey the important literature on the period.
- 7405. Studies in Nineteenth Century Europe. (3).**
Readings and reports to survey the important literature on the period.
- 7406. Studies in Twentieth Century Europe. (3).**
Readings and reports to survey the important literature on the period.
- 7521. Studies in European Diplomacy, 1848-1919. (3).**
Readings and reports to survey the important literature on the period.
- 7522. Studies in European Diplomacy, 1919-1939. (3).**
Readings and reports to survey the important literature on the period.
- 7630. Studies in Early American History (to 1800). (3).**
Readings and reports to survey the important literature on the period.
- 7640. Studies in United States History, 1800-1865. (3).**
Readings and reports to survey the important literature on the period.
- 7680. Studies in United States History, 1865-1917. (3).**
Readings and reports to survey the important literature on the period.
- 7700. Studies in United States History, 1917-1950. (3).**
Readings and reports to survey the important literature on the period.
- 7871. Studies in United States Urban History. (3).**
Readings and reports to survey the important literature on the period.
- 7875. Studies in United States Diplomatic History. (3).**
Readings and reports to survey the important literature on the period.
- 7920. Studies in Southern History. (3).**
Readings and reports to survey the important literature on the period.
- 7940. Studies in the American West. (3).**
Readings and reports to survey the important literature on the period.
- 7960. Studies in State and Local History. (3).**
Readings and reports to survey the important literature on the period.
- †7996. Thesis. (6).**
The student must write and defend satisfactorily a thesis on a subject approved by his major professor.
- †9000. Doctoral Dissertation. (3-12).**
No more than 12 hours may be applied toward degree. PREREQUISITE: Admission to candidacy.

†Grades of S, U, or IP will be given.

HOME ECONOMICS

PROFESSOR MARQUITA L. IRLAND, *Chairman*

Room 404, Manning Hall

The Home Economics department offers course work primarily designed to meet the teaching endorsement requirement for the degree of Master of Education in Secondary Education. Students pursuing a degree in this area must hold secondary school certification in Home Economics.

The prefix used by the department is HMEC.

HOME ECONOMICS (HMEC)

7103. Consumer Education in Secondary School Home Economics Curriculum (3).

Philosophy, design and techniques for incorporating consumer education in the secondary and occupational emphasis programs. Special consideration will be given to education for the culturally deprived, handicapped, ageing, and working with individual families.

7201. Marriage and Family Relations. (3).

A consideration of interpersonal relations in the family. Designed for advanced study of the growing body of scientific knowledge concerning marriage, the experiences which precede it and the adjustments and challenges growing out of it. Special attention will be given to husband-wife, parent-child and sibling relationships and to stages in the family life cycle.

7301. Seminar in Child Development. (3).

Review, interpretation and evaluation of current literature and research in defined areas of child development. Implications of research findings for teaching, counseling, and/or research in child development.

7383. Workshop in the Improvement of Instruction. (3).

Designed to provide current information, based on research and scholarly investigation, in specific areas of study encompassed in the secondary Home Economics curriculum. Effective teaching and evaluation techniques will be discussed and demonstrated.

LIBRARY SERVICE

ASSOCIATE PROFESSOR EVELYN GREER CLEMENT, *Chairman*

Room 201, Brister Library

The prefix used by the department is LIBS. General requirements of the Graduate School apply. In addition, a reading knowledge of at least one foreign language is highly desirable.

Students majoring in Library Service for the Master of Education Degree must complete one of the following programs of study.

- A. Prerequisite undergraduate courses — 9 semester hours
 LIBS 4131, LIBS 4232, and either LIBS 4231 or LIBS 4401. Students who hold state school library certification are assumed to have met this requirement.
 Required graduate courses — 33 semester hours
 9 semester hours Education, including EDFD 7521 and EDUC 7303.
 15 semester hours Library Service courses, as approved by the student's advisor.
 9 semester hours outside the College of Education, to be taken as a meaningful, related sequence within a single department or closely related departments, subject to approval by the student's advisor.
- B. Students holding elementary or secondary school certification may elect to complete the requirements for state school library certification concurrently with the requirements for the M.Ed. Undergraduate prerequisites apply as in (A) above.
 Required graduate courses — 36 semester hours
 6 semester hours Education, EDFD 7521, EDUC 7303
 21 semester hours Library Service courses, including LIBS 6111, LIBS 6121, and LIBS 6331.
 9 semester hours outside the College of Education as in (A) above.

Each candidate for the M.Ed. with the major in Library Service must complete a minimum of 33-36 graduate semester hours and pass a written and/or oral comprehensive examination.

LIBRARY SERVICE (LIBS)

6111. Books and Related Library Materials for Children. (3).

Primarily a reading course based on materials suitable for elementary school children; leisure-time interests and curricular needs; criteria for evaluating books and related materials such as magazines, phonograph records, radio programs, and films; aids used in their selection; types of literary and informational books, authors, illustrators, and publishers; story-telling and other devices for encouraging reading.

6121. Books and Related Library Materials for Young People. (3).

This course is presented in the same manner as Library Service 6111, but is adapted to materials on the junior and senior high school levels; attention is also given to adult books to enable librarians to work more effectively with faculty and community groups.

6131. Introduction to Bibliography. (3).

An introduction to the theory and purpose of bibliography as a form of access to information, with emphasis on general reference sources. Introduces principles, practices, and methods of reference service. Sets the foundation for advanced bibliography courses by developing recognition of types and characteristics as well as representative reference tools.

6231. Organization of Materials. (3).

Includes instruction and practice in simplified procedures for acquisition, preparation, organization and circulation of books and related library materials, such as pamphlets, periodicals and audio-visual aids.

6232. Cataloging and Classification.

Introduction to the principles and techniques of the cataloging and classification of books and other library materials.

6331. School Library Administration. (3).

The library is treated as a service agency in this course. Emphasis is given to the place of the library in the instructional and guidance program of the school and to the philosophy and purposes of libraries and librarianship. Included are such problems as standards and evaluation, public relations and publicity, support, housing and equipment, training of assistants and library study hall relationships. Field trips are made to different types of libraries.

6401. Foundations of Librarianship. (3).

An introduction to librarianship as a profession and the library as an institution in the cultural and political setting. Examine the influence of social issues, societal needs, professional organizations, and federal legislation on the goals, ethics, organization, programs, and problems of libraries and librarians.

7010. History of Books and Libraries. (3).

An introduction to the history and development of libraries from the earliest times to the present, including the changing role of libraries as disseminators of recorded knowledge. Examines the nature of library collections from papyrus rolls and clay tablets through the invention of printing to the collections of new media in the twentieth century. PREREQUISITES: LIBS 3131, LIBS 4231 (6 hours).

7011. Library Management and Organization. (3).

Emphasis on understanding the basic functions of management and their application to library administration, including principles, theories, philosophies, practices and research findings. Stress the universality of management functions in all phases of library operations in all types and sizes of libraries. PREREQUISITES: LIBS 4231, LIBS 4232, LIBS 3131 (9 hours).

7501. Bibliography of the Humanities and Social Sciences. (3).

An introduction to the nature, scope, and distinguishing characteristics of the several disciplines comprising the humanities and social sciences. Includes examination of classic and contemporary literature, methodology, and information sources in these fields.

7601. Introduction to Information Science. (3).

Introduction to methodology and techniques for storing and retrieving information. Review various types of equipment for handling information and providing services in libraries, including an introduction to systems planning and automation concepts for traditional and non-conventional libraries. Emphasize practical applications.

7701. Selection of Library Materials. (3).

Introduction to the philosophy and practice of building the library collection. Emphasis on the use of bibliographic aids and on the principles of selection and evaluation of library materials for adults and young people in all types of libraries.

7991. Special Problems in Librarianship. (2).

Independent investigation and report of a research problem or directed readings in a selected area of librarianship under the direction of a faculty member. May be repeated with a change in content for a total of four hours. PREREQUISITE: 6 graduate hours in LIBS.

7992. Workshop in Librarianship. (1-3).

Designed for in-service training and continuing education of professional librarians in all types of libraries. Content will change as indicated by trends and problems in the field and the expressed needs of working librarians. PREREQUISITE: Library experience and consent of instructor.

MANAGEMENT

PROFESSOR LEONARD D. ROSSER, *Acting Chairman*

Room 202, The College of Business Administration Building

In the Department of Management, qualified students may work toward the M.S. with a major in Management or the M.B.A. degree with an area of concentration in Management.

A. Requirements for the M.B.A. degree are on page 62.

B. Prerequisites for M.S. in Management:

In addition to Core I prerequisites, students should have completed or complete all necessary prerequisites for the advanced course work.

C. Each candidate for the M.S. degree in Management must complete a minimum of 33 semester hours and pass a written and/or oral examination.

The 33 semester hours comprising the M.S. degree include 21 semester hours (24 hours if a thesis is written) of approved work in the major and 9-12 hours in collateral courses approved by the student's adviser. At least 24 of the 33 semester hours required must be in courses designated primarily for graduate students (7000 level or above).

6210. Personnel Administration. (3).

Employer-employee relationships; job analysis; recruitment, selection, training, transfer, promotion, and dismissal of employees; industrial unrest; wage plans and policies; employee health, interest and morale; dealing with Unions. PREREQUISITE: Management 3110.

6220. Collective Bargaining. (3).

Labor-management relations from the standpoint of collective bargaining contracts. Emphasis is given to the process of negotiating agreements, including procedures, tactics and subject matter. PREREQUISITE: Management 3110.

6240. Wage and Salary Administration. (3).

Systematic examination of the administration of wage and salary as a tool of management. Through the use of the job descriptions, job analysis, and job evaluation methods instruction is given in the techniques of rationalizing wage structures. Analyses of some of the outstanding considerations which must be taken into account in installing and administering wage programs are made. PREREQUISITE: Management 4210 and Management 2711

6420. Human Relations in Business. (3).

A study of the principles of human relations as applied to business management. PREREQUISITE: Management 3110.

6510. Production Management. (3).

A course devoted to the development of scientific management, organization of the production function, operation and control of production systems, application of the analytical methods of cost analysis; simulation and statistical analysis. Applications of schematic analysis to production will also be covered. PREREQUISITES: Management 3711 and Management 3110.

6750. Computer Programming Principles and Applications. (3).

A course emphasizing the programming of electronic digital computers. Current programming languages will be taught such as FORTRAN AND COBAL. The students will be encouraged to program and run several business oriented problems in both languages. PREREQUISITE: Management 3750 and one college level mathematics course, or permission of the instructor.

6760. Systems Analysis and Operations Research. (3).

An introductory study of decision-making which concentrates on the model building process within the decision theory framework. The electronic computer will be used where appropriate to solve problems of linear programming, waiting line theory, simulation, game theory and other statistical problems of a business and economic nature. PREREQUISITES: Management 3110, Management 3711, and Management 4750, or consent of the instructor.

6780. Systems Design for Business Activities. (3).

Emphasis will be given to computer systems design for typical business applications involving the automation of business activities. This course will concern estimates of computer requirements; organizational arrangement; planning the total system; flow-charting; conversion problems; cost and performance evaluation. The objective is to simulate the middle level executive role in the transition and integration of business operations into computer oriented systems. PREREQUISITE: Management 3750, Management 3711.

7000. Advanced Organization and Management. (3).

Examination of the theories of management and organization. Control and its effect on motivation and interpersonal relationships in the various types of organizations will be covered. Managerial techniques and functions will be developed and integrated both from the standpoint of administrative and production management through case studies, current literature, and assigned text materials. PREREQUISITE: Consent of the instructor.

7011. Survey of Statistical Methods in Business and Economics. (3).

A survey course examining the various statistical techniques that are appropriate in analyzing business and economic problems in a management framework. The course is designed for those graduate students who have had little or no previous work in statistics. PREREQUISITE: MATH 1203 or higher and consent of the instructor. (Credit will not be given for both this course and Management 2711/3711 or equivalent.)

7210. Seminar in Industrial Relations. (3).
(formerly Advanced Industrial Relations)

A study of selected problems in labor-management relations. PREREQUISITE: Consent of instructor.

7291. Manpower I. (3).

Trace the development of manpower theory from its beginning in Western culture through present policies and legislation in the U.S. Emphasis will be given to the industrial revolution, great depression, recent urban migration, changing technology, and recent manpower legislation. PREREQUISITES: Economics 2110 or 2120 or consent of the Instructor.

7292. Manpower II. (3).

The economics and sociology of labor force participation within the theoretical framework of economics and sociology. An examination of the literature will be made with regard to social, educational, and demographic variables as they relate to participation. The labor force will also be examined within the context of price and employment theory. PREREQUISITES: MGMT 7291 or consent of the Instructor.

7293. Manpower III. (3).

A survey of published human resource data and survey methods with emphasis upon theoretical concepts involved in measurement and analysis. An examination of the major concepts of labor productivity and their application will receive special treatment. Preparation of the student for writing a thesis is implicit. PREREQUISITES: MGMT 7291 or Consent of the Instructor.

7410. Seminar in Business Policy. (3).

(formerly Advanced Management of Business Enterprise)

The development of the Top Management viewpoint, the basic objective being to develop executive abilities and creative thinking. Selected problem areas of modern business will be explored, alternative courses of action appraised, and decision-making ability developed. PREREQUISITE: 12 semester hours of graduate business administration courses.

7420. Quantitative Methods for Business Decisions. (3).

Special study of selected current quantitative problems in this area. For the most part, individual studies will be pursued with group analysis and discussion at regular class meetings. PREREQUISITE: Consent of instructor.

7421. Seminar in Organizational Behavior. (3).

Special study of selected current qualitative problems in this area. For the most part, individual studies will be pursued with group analysis and discussion at regular class meetings. PREREQUISITE: Consent of instructor.

7422. Seminar in Organizational Theory. (3).

An examination of the principles and techniques of organization covering managerial functions and processes, types of organization structure and the development of managerial concepts in terms of executive action. Both the classical and behavioral approaches to organization will be analyzed. PREREQUISITE: Consent of instructor.

7910. Problems in Management. (1-4).

Directed independent research projects in an area selected by the student with approval of the staff member supervising. PREREQUISITE: 6 hrs. of graduate course work in the area selected.

7920. Readings in Management. (3).

A study of selected readings in the field of Management. PREREQUISITE: Management 4410 or 6410 (Student cannot obtain credit in this course and also in Management 7910 without consent of instructor.)

†7996. Thesis. (3-6).

Application for writing a thesis must be filled out on an approved form after consultation with the major professor and filed with the Dean of The Graduate School.

MARKETING

PROFESSOR WAYLAND A. TONNING, *Chairman*

Room 302, The College of Business Administration Building

In the Department of Marketing, students may work toward the M.S. with a major in Marketing or the M.B.A. degree with an area of concentration in Marketing.

A. Requirements for the M.B.A. degree are on page 62.

B. Master of Science in Marketing:

The program is open to students who have an undergraduate degree in Business Administration. The purpose of this program is to provide a depth of competence in the field of marketing. This, in turn, will prepare students for business as well as academic careers.

C. Prerequisites for M.S. in Marketing:

In addition of Core I prerequisites, students should have completed or complete all necessary prerequisites for the advanced course work.

D. Each candidate for a M.S. degree in Marketing must complete a minimum of 33 semester hours of approved course work and pass a written and/or oral examination. The 33 semester hours comprising the M.S. in Marketing include a minimum of 21 hours in the major (24 if a thesis is written). Four of the following courses must be included in the major area. Marketing 7010, Current Aspects of Marketing; Marketing 7011, Marketing Strategies and Tactics; Marketing 7012, Marketing Structure and Administration; and Marketing 7013, Marketing Controls; Marketing 7014, Micro-Marketing Systems; and Marketing 7015, Research Methodology. The remaining 9 to 12 hours are in collateral courses approved by the student's adviser. At least 24 of the 33 semester hours required must be in courses designated primarily for graduate students (7000 level or above).

7010. Current Aspects of Marketing. (3).

A comprehensive review of current marketing literature. Emphasis is placed on Marketing innovations from the standpoint of functions, institutions, and concepts.

7011. Marketing Strategies and Tactics. (3).

An analytical approach to planning as it relates to the marketing activities of a business enterprise. Focus is placed on: (1) Development of a qualitative-quantitative framework for decision-making; and (2) Fundamental strategies and tactics.

7012. Marketing Structure and Administration. (3).

An appraisal and diagnosis of organizational structure and executive action as they relate to marketing decisions regarding both external and internal factors.

7013. Marketing Controls. (3).

A study of the adjustment of marketing operations to predetermined standards or control values in an effort to minimize performance variations. Stress will be placed on communicating to management the vital information necessary for sound administrative and planning decisions.

7014. Marketing Systems Design. (3).

The marketing system is studied from the standpoint of its inputs, operation, control and outputs so that it can be revised as greater efficiency is required. Simulation, information systems and other techniques helpful in designing effective marketing systems are introduced.

7015. Research Methodology. (3).

The nature and scope of research philosophy and methods in business. Both primary and secondary research procedures will be studied. Emphasis will be focused on the preparation and presentation of independent research findings and on utilization of multi-variate analysis techniques.

7016. Introduction to Quantitative Marketing Methods. (3).

Introduction to analytical tools available to marketing administration, including use of the Computer, to develop decision criteria under known and uncertain operating conditions. Emphasis is upon the application of basic quantitative techniques to marketing situations.

7020. History of Marketing Institutions and Thought. (3).

An introduction to the concepts and theories advanced in the development of institutions, channels, functions, and processes in the field of marketing.

7021. Pricing Theories and Policies. (3).

An examination of the role of prices in our economy and of price making under varying conditions of competition. Also included is an examination of the acquisitive and social implications of pricing policies.

7022. Behavioral Approaches to Marketing. (3).

An analysis of the contributions of the behavioral science disciplines to consumer motivations, buying behavior, market adjustment, and product innovation. These processes are evaluated with reference to psychological drives and other behavioral science concepts at each stage of distribution. PREREQUISITE: MKTG 7016.

7023. Advanced Quantitative Marketing Methods. (3).

A critical examination of the various quantitative tools to gain an understanding of both capabilities and their limitations in marketing operations. PREREQUISITES: MKT 7016.

7030. Marketing Seminar. (3).

Special study of current problems in marketing. For the most part, individual studies will be pursued with group analysis and discussion.

7910. Problems in Marketing. (3-6).

Directed independent research projects in an area selected by the student with the approval of the staff member supervising. PREREQUISITE: 9 hours of graduate course work in Marketing.

†7996. Thesis. (3-6).

Application for writing a thesis must be filled out on an approved form after consultation with the major professor and filed with the dean of The Graduate School.

†Grades of S, U, or IP will be given.

MATHEMATICS

PROFESSOR STANLEY P. FRANKLIN, *Chairman*

Room 373, Mathematics and Foreign Languages Building

Graduate study in the Department of Mathematics is designed to develop a broad foundation of reasonable depth in mathematics. Prospective graduate students are expected to present a satisfactory record of undergraduate work in mathematics, equivalent to the baccalaureate degree requirements at Memphis State University. Students who are deficient in undergraduate work may, however, be admitted to the program of study and their deficiencies removed by completion of the appropriate courses.

Courses of study are offered leading to the degrees of Master of Science, Master of Science in Teaching, and the Doctor of Philosophy. Areas of concentration within the M.S. degree are offered for Statistics and Computer Sciences as well as for Mathematics. For the degree of Master of Science, a student may complete both a major and a collateral area in any department in which he is qualified to do graduate work. For the degree of Master of Science in Teaching, a student may complete a major in mathematics and a collateral area as approved by his advisor. The area of concentration of the Doctor of Philosophy degree is in the college teaching of mathematics.

General requirements for the degrees Master of Science in Teaching and Master of Science are summarized on page 66, and for the degree of Doctor of Philosophy on pages 75 to 78.

Departmental requirements for the Master's Degrees are as follows:

1. Satisfactory completion of thirty-three (33) semester hours of graduate credit.
2. For the M.S. degree in mathematics, completion of the following courses unless the student has previously completed an equivalent course:
 - a. Mathematics 6241, Linear Algebra
 - b. Mathematics 6351, Advanced Calculus II
 - c. Mathematics 6361, Complex Variables
 - d. Mathematics 7261, Algebraic Theory
3. A program of study approved by an advisor appointed by the department chairman, and subject to review and approval by the candidate's advisory committee appointed after the filing of the application for admission to degree candidacy (normally done after earning between 12 and 18 credit hours).
4. Satisfactory completion of a comprehensive examination over the course work that the student has completed.

Descriptions of program requirements for the doctoral degree are available in the department.

A student who wishes to take a course without having had all of its prerequisites must obtain the permission of the course instructor and the departmental Director of Graduate Studies.

6111. Philosophy of Mathematics. (3).

Logical methods; axiomatic systems; independency and consistency; the nature of mathematics. PREREQUISITE: Mathematics 3111.

6151. History of Mathematics. (3).

The development of mathematics from the earliest times to the present; problem studies; parallel reading and class reports. PREREQUISITE: Mathematics 3111.

6171. Special Problems in Mathematics. (1-3).

Individual directed study in a selected area of mathematics chosen in consultation with the instructor. Repeatable by permission. PREREQUISITE: Permission of the instructor.

6221. Theory of Numbers. (3).

Divisibility properties of integers; prime numbers; congruences; Diophantine equations; quadratic residues; number theoretic functions. PREREQUISITE: Mathematics 3111.

6241. Linear Algebra. (3).

Systems of linear equations; matrices and elementary row operations; vector spaces and subspaces; computations concerning subspaces; linear transformations; linear functionals; annihilators; polynomials; Lagrange interpolation; polynomial ideals; prime factorization of a polynomial. PREREQUISITE: Mathematics 3262.

6262. Abstract Algebra. (3).

Groups; vectors and vector spaces; matrices; linear groups; determinants and canonical forms; Boolean algebras and lattices; rings and ideals; Galois theory. PREREQUISITE: 3262.

6351. Advanced Calculus. (3).

Functions of several variables; partial differentiation; multiple integrals; infinite series of constants; power series; uniform convergence and limits; improper integrals; Stieltjes integration. PREREQUISITE: Mathematics 3111.

6361. Complex Variables. (3).

Complex numbers; point sets and mappings; analytic functions; integration. PREREQUISITE: Mathematics 2322.

6391. Applied Mathematics. (3).

Laplace transforms; Fourier series; introduction to partial differential equations. PREREQUISITE: Mathematics 3391.

6392. Applied Mathematics. (3).

Partial differential equations. PREREQUISITE: Mathematics 6391.

6411. Topology. (3).

Introductory set theory; metric spaces; topological spaces; mappings; Hausdorff spaces; connectedness and compactness. PREREQUISITES: Mathematics 3111.

6711. Advanced Computer Programming. (3).

Advanced digital computer programming including the full utilization of Operating Systems, Scientific Sub Routine Packages, and hardware capabilities such as tape and disk data management. PREREQUISITE: Mathematics 3711.

6721. Numerical Analysis. (3).

Study of computer-oriented methods for solution of polynomial and transcendental equations and ordinary differential equations; matrix calculations including inverses, determinants, eigenvalues, eigenvectors, etc.; numerical quadrature; polynomial interpolation; least squares curve fitting. PREREQUISITES: Mathematics 2321 and 3711.

7171. Workshop in Junior High Mathematics. (3).

This course is designed to provide in-service training, with emphasis on new course content.

7174. Workshop in Senior High Mathematics. (3).

This course is designed to provide in-service training, with emphasis on metric geometry.

- 7181. Introduction to Modern Mathematics. (3).**
Basic theory in the logical foundations of arithmetic; the postulational development of the number system, symbolic logic.
- 7221. Algebraic Number Theory. (3).**
Farey fractions; simple continued fractions; distribution of primes; algebraic numbers; partition function. PREREQUISITE: Mathematics 6221.
- 7222. Algebraic Number Theory. (3).**
Selected topics from advanced theory of numbers. PREREQUISITE: Mathematics 7221.
- 7241. Linear Algebra. (3).**
Vector spaces; linear transformations and functionals; determinants; rational and Jordan forms; inner product spaces; bilinear forms. PREREQUISITE: Mathematics 6241.
- 7261. Algebraic Theory. (3).**
Theory of groups, rings, integral domains, and fields, with applications. PREREQUISITE: Mathematics 6262.
- 7262. Abstract Algebra. (3).**
Theory of semi-groups, rings, ideals, modules, integral domains and fields; extension of rings and fields; lattices. PREREQUISITE: Mathematics 7261.
- 7281. Linear Algebra for Teachers. (3).**
Euclidean n -space; vector spaces; subspaces; linear independence and bases; linear transformations; matrices; systems of linear conditions; characteristic values and vectors of linear transformations.
- 7282. Abstract Algebra for Teachers. (3).**
A basic abstract algebra course designed especially for teachers. Topics will include: groups, rings, integral domains, fields; an axiomatic approach to the development of algebra; concepts of proof. PREREQUISITE: College Algebra.
- 7351. Real Variables. (3).**
Jordan and Lebesgue measure in E^n ; measurable functions; Lebesgue integrals; multiple and iterated integrals; metric spaces. PREREQUISITE: Mathematics 6351.
- 7355. Functional Analysis. (3).**
Bounded linear transformation and linear functionals on Banach and Hilbert spaces. PREREQUISITE: Mathematics 6351.
- 7361. Complex Variables. (3).**
Power series; calculus of residues; conformal representations. PREREQUISITE: Mathematics 6361.
- 7362. Complex Variables. (3).**
A continuation of Mathematics 7361. PREREQUISITE: Mathematics 7361.
- 7381. Calculus for Secondary Teachers. (3).**
Function concept; elementary function theory; selected topics from analytical geometry and calculus.
- 7391. Special Functions. (3).**
Infinite products; asymptotic series; generalized hypergeometric functions; the confluent hypergeometric function. PREREQUISITE: Mathematics 6391.

7392. Special Functions. (3).

Methods of obtaining and using generating functions; orthogonal polynomials with applications. PREREQUISITE: Mathematics 7391.

7393. Advanced Differential Equations. (3).

Existence theorems, properties of solutions depending on initial conditions and parameters, dynamical systems, and applications. PREREQUISITE: Mathematics 6392.

7395. Stability Theory. (3).

Theory of stability of solutions of ordinary differential equations; existence and uniqueness theorems; Lyapunov's direct method. PREREQUISITES: Mathematics 3391, 6241.

7411. Point Set Topology. (3).

An axiomatic approach to compactness, separability, connectedness, metrizability and other topological properties. PREREQUISITE: Mathematics 6411.

7412. Point Set Topology. (3).

A continuation of Mathematics 7411. PREREQUISITE: Mathematics 7411.

7511. Geometric Theory. (3).

Foundations of geometry; extensions of Euclidean geometry; non-Euclidean geometry; introduction to projective geometry. PREREQUISITE: Mathematics 3111 or 7181.

7521. Algebraic Geometry. (3).

Erlanger program; linear transformations, subgeometries of projective geometry; metric geometries, inversion geometry. PREREQUISITE: Mathematics 7511.

7531. Modern Differential Geometry. (3).

Curves, tensor calculus, surfaces, first and second fundamental forms, mappings, length and area, variations problems, special surfaces. PREREQUISITE: Mathematics 7351.

7681. Probability for Secondary Teachers. (3).

Probability spaces, theory of statistical inference, physical interpretations of probability.

7711. Mathematical Foundations of Computer Science. (3).

Background in abstract algebra required for the study of switching, automata theory, and the theory of computation. Topics include sets, relations, functions, groups, semi-groups, lattices and Boolean logic. Software applications are made to various areas of information science. PREREQUISITE: Mathematics 3262.

7712. Automata Theory. (3).

Finite automata, Kleene's theorem; infinite machines and effective computation, recursive function theory, Post systems and context-free languages; decomposition of machines, stochastic automata. PREREQUISITE: Mathematics 7710 and 6262.

7721. Advanced Numerical Analysis. (3).

A continuation of Mathematics 6722; specialized methods and techniques in the field of numerical analysis. PREREQUISITE: Mathematics 6722.

- 7731. Systems Simulation. (3).**
Computer simulation of large scale systems using the theory of sampling and Monte Carlo techniques. GPSS language and its application. PREREQUISITES: Mathematics 3711, 6611.
- 7741. Linear Programming Techniques. (3).**
Convex sets and linear inequalities; simplex computational procedure, quality problems of linear programming; revised simplex method; parametric linear programming; sensitivity analysis; theory of games. PREREQUISITE: Mathematics 6241.
- 7743. Non-Linear Programming Techniques. (3).**
The theory of non-linear programming including extensions to parametric, integer and stochastic situations. PREREQUISITE: Mathematics 7741.
- 7783. Computer Programming for Teachers. (3).**
Basic techniques of numerical analysis; finite differences, interpolation, solution of equations, integration; laboratory use of computers. PREREQUISITE: College Algebra.
- 7791. Problems in Computer Science. (1-4).**
Directed independent problem research and program design, writing and documentation in an area selected by the student with approval of both the adviser and supervising staff members. Repeatable by permission. PREREQUISITE: Permission of instructor.
- 7793. Seminar in Computer Science. (1-3).**
Advanced topics and recent developments in computer science. Repeatable by permission.
- 7821. Special Problems in Mathematics. (1-3).**
Directed individual study in a selected area of mathematics chosen in consultation with the instructor and the student's advisor. Repeatable by permission. PREREQUISITE: Permission of the instructor.
- †7996. Thesis. (3-6).**
- 8011. Practicum in College Teaching of Mathematics. (Variable and Repetitive Credit).**
The methods and techniques of teaching mathematics at the college level; supervised instruction conferences, group discussions; students will participate in current research projects in mathematics methodology. PREREQUISITE: Permission of the Instructor.
- 8211. Topics in Algebra. (3).**
Repeatable by permission. PREREQUISITE: Permission of the Instructor.
- 8261. Group Theory. (3).**
General Topological groups, compact groups, general structure theory, free groups and group algebras. PREREQUISITE: Mathematics 7262.
- 8262. Homological Algebra and Ring Theory. (3).**
Modules over a ring, homomorphisms and tensor products of modules, functors and derived functors, homological dimension of rings and modules. PREREQUISITE: Mathematics 7262.
- 8263. Field Theory. (3).**
Field theory including algebraic and transcendental extensions, Galois theory, topics from multilinear algebra. PREREQUISITE: Mathematics 7262.

8264. Lattice Theory. (3).

Partially ordered sets, semilattices, lattices, completeness and conditional completeness, modularity, complementation, embedding theorems, applications to rings and groups. PREREQUISITE: Mathematics 7262.

8311. Topics in Analysis. (3).

Repeatable by permission. PREREQUISITE: Mathematics 7351.

8351. Measure Theory. (3).

Modern theories of integration on Hausdorff spaces; abstract measure spaces and topological groups. PREREQUISITES: Mathematics 7351, 7262, and 7411.

8355. Functional Analysis. (3).

Vector spaces, Banach spaces, Hilbert space; linear functionals and operators in such spaces; spectral theory. PREREQUISITE: Mathematics 7355.

8356. Functional Analysis. (3).

A continuation of Mathematics 8355. PREREQUISITE: Mathematics 8355.

8391. Optimization Techniques. (3).

Calculus of variations, gradient method, Pontryagin maximum principle. PREREQUISITE: Mathematics 6391.

8411. Algebraic Topology. (3).

Simplexes, complexes, chains and homologies. PREREQUISITES: Mathematics 6411, 7261.

8412. Algebraic Topology. (3).

A continuation of Mathematics 8411. PREREQUISITE: Mathematics 8411.

8421. Topics in Geometry and Topology. (3).

Repeatable by permission. PREREQUISITE: Mathematics 7412.

8621. Topics in Probability and Statistics. (3).

Repeatable by permission. PREREQUISITE: Permission of the Instructor.

8721. Topics in Computer Science. (3).

Repeatable by permission. PREREQUISITE: Permission of the Instructor.

8811. Advanced Seminar in Mathematics. (3).

PREREQUISITE: Permission of the Instructor.

8821. Special Problems in Mathematics. (1-3).

Individual directed study in a selected area of mathematics chosen in consultation with the instructor. (This course, may be repeated for a maximum of 9 credits). PREREQUISITES: Permission of the Instructor.

8822. Mathematical Reading and Research. (Variable and Repetitive Credit).

PREREQUISITE: Permission of the Instructor.

8881. Advanced Seminar in Mathematics Education. (1-3).

Repeatable by permission. PREREQUISITE: Permission of the Instructor.

8921. Topics in Differential Equations. (3).

Repeatable by permission. PREREQUISITE: Mathematics 7393.

8922. Topics in Applied Mathematics. (3).

Repeatable by permission. PREREQUISITE: Permission of the Instructor.

9000. Dissertation. (9-15).

Independent research for the Ph.D. degree. Application for writing a dissertation must be filled out on an approved form after consultation with the Doctoral Advisor and Committee and filed with the Dean of the Graduate School.

STATISTICS

6611. Statistical Methods. (3).

Intended for students in the engineering, physical and mathematical sciences. Binomial, hypergeometric, Poisson, multinomial and Chi-square distributions; tests of randomness and non-parametric tests; t-tests; tests of hypotheses; correlation analysis. PREREQUISITE: Mathematics 2321.

6612. Statistical Methods. (3).

Continuation of Statistics 6611. An introduction to experimental design and the analysis of variance; regression analysis; analysis of covariance.

6613. Introductory Statistical Theory. (3).

Distribution of functions of random variable; limiting distributions; correlation and regression; Neyman-Pearson Lemma; likelihood ratio tests; sufficient statistics; point estimation. PREREQUISITE: Statistics 3631.

6631. Probability. (3).

Stationary and non-stationary stochastic processes; Markov chains and applications; continuous time Markov chains; Poisson processes and applications; Brownian motion; branching processes. PREREQUISITE: Statistics 3631, Mathematics 3241.

7621. Quantitative Statistical Methods. (3).

Introduction to the concepts of random sampling and statistical inference, estimation and testing hypotheses; chi-square tests, simple regression analysis. PREREQUISITE: Mathematics 1203 or 1211.

7622. Quantitative Statistical Methods. (3).

A continuation of Statistics 7621; multiple and curvilinear regression analysis; analysis of variance; introduction of basic experimental design. PREREQUISITE: Statistics 7621.

7631. Stochastic Processes. (3).

Stationary and non-stationary stochastic processes; autoregressive processes and correlogram analysis, harmonic-periodogram and spectral analysis; Markov and diffusion processes. PREREQUISITE: Statistics 6631.

7641. Analysis of Variance. (3).

The analysis of variance in experimental statistics, single and multiple classification, factorials, analysis of designed experiments including randomized blocks, Latin squares, split plots, simple confounded designs, multiple comparisons and orthogonal contrasts. PREREQUISITE: Statistics 6611.

7642. Experimental Design. (3).

Fundamental concepts in designing experiments, justifications of linear models, randomization, principle of blocking, use of concomitant observations, principle of confounding, fractional replication, composite designs, incomplete block designs. PREREQUISITE: Statistics 7641.

7643. Least Squares and Regression Analysis. (3).

Simple, multiple, and curvilinear regression analysis, orthogonal polynomials, analysis of non-orthogonal and incomplete experiments by least squares methods, computer methods for least squares problems. PREREQUISITE: Statistics 6611.

7645. Sampling Techniques. (3).

Planning, execution, and analysis of sampling from finite populations; simple, stratified, multi-stage, and systematic sampling; ratio estimates. CO-REQUISITE: Statistics 6611 or Statistics 6613.

7647. Nonparametric Statistical Methods. (3).

Use of distribution-free statistics for estimation, hypothesis testing, and correlation measure in designing and analyzing experiments. PREREQUISITE: Statistics 6611 or 6613.

7651. Theory of Linear Models. (3).

Quadratic forms, point and interval estimation, multivariate normal distribution; linear models, general linear hypothesis of full rank computing techniques; functional relationships. PREREQUISITES: Statistics 6611, 6613, and 7654.

7652. Theory of Nonparametric Statistics. (3).

The theory and development of distribution-free statistics. PREREQUISITE: Mathematics 7654.

7654. Inference Theory. (3).

General theory of estimation and sufficiency; maximum likelihood and Bayesian estimators; minimum variance estimators; Neyman-Pearson theory of testing hypotheses; elements of decision theory. PREREQUISITE: Statistics 6613.

7671. Advanced Topics in Statistics. (1-3).

Directed individual study of recent developments in Statistics. (This course may be repeated for a maximum of 9 credit hours.) PREREQUISITE: Permission of the Instructor.

†Grades of S, U, or IP will be given.

MECHANICAL ENGINEERING

PROFESSOR HOWARD S. WOLKO, *Chairman*

Room 108, Engineering Building

The degree of Master of Science is offered in Mechanical Engineering. The non-thesis option requires 33 semester credits of course work of which normally 21 are in the major area and 12 are in collateral areas. The thesis option requires 30 credits of which normally 18 are in the major area, 6 are in thesis and 6 are in a collateral area. Applications for admission should be sent to the Dean of The Graduate School. The Graduate School requires the receipt of test scores on the Miller Analogies Test or the Graduate Record Exam before approval of admission to graduate work. Student assistantships are available. Application should be made to the chairman of mechanical engineering about April 1.

Full time students may register for a maximum of 16 credits per semester; students admitted provisionally may register for 12 credits; student assistantships may register for nine credits of courses plus a thesis or problem course. For the degree at least 18 credit hours must be at the 7000 level. The remainder may be at either the 6000 or 7000 level. Credit for work taken elsewhere is limited to six credits. A "B" average is required for graduation.

Student programs are arranged in consultation with the mechanical engineering adviser. The following courses are offered on sufficient demand.

6325. Advanced Mechanics of Materials. (3).

Unsymmetrical bending and torsion of flexural members of non-circular cross-section, beams on elastic foundations and other selected topics; deformation beyond the elastic limit, theories of failure.

6341. Mechanical Engineering Analysis. (3).

Computer analysis of mechanical engineering problems.

6371. Mechanical Vibrations. (3).

Kinematics of harmonic and non-harmonic vibrations; systems of one and several degrees of freedom, free and forced vibrations; self-excited vibration. PREREQUISITE: Differential Equations.

7301. Mechanics of Deformable Bodies. (3).

Analysis of non-rigid bodies, statically indeterminate members, instability-buckling loads, thick-walled cylinder analysis and other selected topics.

7302. Theory of Continuous Media. (3).

Analysis of stress and deformation at a point; derivation of the fundamental equations in Cartesian tensor notation by application of the basic laws of conservation of mass, energy, and momentum in mechanics and thermodynamics. PREREQUISITE: Consent of instructor.

7303. Experimental Stress Analysis. (3).

Application of electric resistance strain gage, photoelasticity and brittle lacquer techniques to the solution of stress analysis problems.

7304. Theory of Elasticity. (3).

Development and clarification of the theories of elasticity used in introductory strength of material. Development and application of more advanced methods for analysis. PREREQUISITES: MECH 3322 or equivalent.

- 7305. Advanced Fluid Flow I. (3).**
Basic equations and perfect fluid theory. Mathematical, numerical, graphical and analog methods for solving ideal flow problems. Viscous fluid theory and introduction to boundary layer theory. Unsteady flows, flows in rotating systems, and density-identified flow. Review of mathematical concepts involved in these topics. PREREQUISITE: Mechanical Engineering 3331 or equivalent.
- 7306. Advanced Fluid Flow II. (3).**
Continuation of Mechanical Engineering 7305.
- 7307. Theory of Plasticity. (3).**
Development of equations and theories for materials in the inelastic stress range. Time-dependent analysis, energy methods, volume change. PREREQUISITE: MECH 3322 or equivalent.
- 7310. Fluid Power Engineering. (3).**
Hydraulic- and air-flow pipes. Pneumatic and hydraulic fluid power-elements and systems. Input-output energy transfer devices.
- 7311. Advanced Topics in Fluid Flow I. (3).**
Subsonic and supersonic compressible flow, shockwaves, and selected topics. PREREQUISITE: Mechanical Engineering 7306 or consent of instructor.
- 7312. Advanced Topics in Fluid Flow II. (3).**
Continuation of Mechanical Engineering 7311.
- 7321. Advanced Heat Transfer. (3).**
Steady and unsteady state. Walls and heat exchangers.
- 7322. Psychrometric Analysis. (3).**
Psychrometrics. Heating, air conditioning, refrigeration.
- 7331. Advanced Thermodynamics I. (3).**
Engineering thermodynamics. PREREQUISITE: Mechanical Engineering 3311 or equivalent.
- 7332. Advanced Thermodynamics II. (3).**
Continuation of 7331. PREREQUISITE: Mechanical Engineering 7331.
- 7341. Space Engineering. (3).**
Jet and rocket propulsion, power, heat transfer, orbits, control.
- 7342. Dimensional Analysis. (3).**
Units, dimensionless numbers. Applications to combustion, fluid dynamics and heat transfer. Similarity and model theory.
- 7351. Nuclear Applications. (3).**
Power generation. Peaceful uses of nuclear energy.
- 7352. Nuclear Defense. (3).**
Effects of nuclear weapons. Civil defense. Shelter design.
- 7361. Advanced Materials Science. (3).**
Study of the structure and properties of engineering materials using solid-state physics. PREREQUISITE: Mechanical Engineering 3361.

7365. Corrosion. (3).

Fundamental causes and mechanisms; corrosion control; study of specific corrosion problems.

7371. Advanced Mechanical Vibrations. (3).

Lagrange's and Hamilton's principles in the study of vibrating systems. Methods of solution for the equations of motion will be presented, including digital computer techniques. PREREQUISITE: Mechanical Engineering 4371, or 6371.

7381. Combustion. (3).

Combustion of fuels. Air requirements, excess air, heat value. Interpretation of analysis of flue-gas products of combustion. Heat transfer.

7391. Projects I. (3).

Independent investigation of a problem selected in consultation with instructor; report required.

7392. Projects II. (3).

Independent investigation of a problem selected in consultation with instructor; report required.

†7996. Thesis. (3-6).

†Grades of S, U, or IP will be given.

MUSIC

PROFESSOR ROBERT SNYDER, *Chairman*

Room 123B, Music Building

In the Department of Music, graduate students may select from the following degree programs:

I. *Master of Music* with a major in music

(Choose one of the four concentration areas.)

- A. *Applied Music* (Requirements: 14 hours in one of the areas listed below, 6 hours in one other area listed below, and 9 hours of electives in other areas in music. A credit-bearing recital or thesis is also required.)

1. *Composition*

2. *Piano*

3. *Organ*

4. *Strings*

5. *Brasses*

6. *Winds*

7. *Percussion*

8. *Vocal Pedagogy*, consisting of 6 hours in applied voice, 6 hours in vocal pedagogy, 6 hours in opera, lecture recital 7995, and 9 hours in music electives (these elective hours must include 2 semesters of song repertory if the student has not taken undergraduate song repertory 4121 and 4122 or the equivalent). A minimum of 6 hours undergraduate credit in two of the following three languages is required: French, German, Italian.

9. *Vocal Performance*, consisting of 12 hours in applied voice, 2 credit-producing recitals, 6 hours in opera, and 9 hours in music electives (these elective hours must include 2 semesters of song repertory if the student has not taken undergraduate song repertory 4121 and 4122 or the equivalent). A minimum of 6 hours undergraduate credit in each of the following languages is also required: French, German, Italian.

- B. *Sacred Music*, consisting of 9 hours in an sacred music core, 6 hours of applied music, 6 hours of music history, and 3 hours each of acoustics, choral techniques, and an elective in music. A credit-bearing recital is also required.

- C. *Music Theory* 15 credit hours required in this area, 6 hours in a minor concentration, and 9 hours of electives in music. A credit-bearing thesis is also required.

- D. *Music History*, consisting of 18 hours in this area, 9 hours in a minor concentration area, and a credit-bearing thesis OR 15 hours in this area, two other minor concentration areas of 6 hours each, and a credit-bearing thesis. (The minor concentration area may be chosen from the curriculum in music theory, in applied music, in music education, or in sacred music.) A reading knowledge of one foreign language must be demonstrated before the student may be admitted to candidacy.

II. *Master of Arts* with a major in music

(Choose one of two concentration areas.)

- A. *Musical Arts: Applied Music*, consisting of a major concentration area of 14 hours, an outside minor of 6 hours, and 9 hours of music electives to be selected from the areas of music history and music theory. A credit-bearing recital is also required.

- B. *Musical Arts: Music History*, consisting of 18 hours in the major concentration area and 9 hours in an approved academic minor in some area other than music. A credit-bearing thesis is also required. A reading knowledge of one

foreign language must be demonstrated before the student may be admitted to candidacy.

III. *Master of Music Education* with a major in Music Education

This degree is structured in such a way as to allow a choice of several plans of emphasis depending upon the preparation, ability, and interest of the student. These plans are detailed in the department brochure.

NOTE: All students enrolled in any graduate music program are required to earn 2 credit-hours in Graduate Ensemble 7921 in addition to the above degree-planned requirements.

GENERAL BASIC REQUIREMENTS FOR MUSIC MAJOR ARE OUTLINED AS FOLLOWS:

I. Prerequisites to graduate standing in music.

- A. A satisfactory grade shall be made on the aural and written theory qualifying examinations. A comprehensive undergraduate course in theory, analysis and ear-training (MU 4231) is recommended for graduate students in need of review and preparation for graduate work in theory. A satisfactory grade in this course will satisfy the graduate entrance requirement in theory.
- B. The qualifying examination in music history and literature shall be taken.
- C. A successful audition (or acceptable compositions in various media for candidates who plan a major concentration area in composition) shall be presented when applicable to the anticipated degree program.

II. Prerequisites to degree candidacy in music.

- A. The program of a student's intended degree shall be planned.
- B. The student shall declare his major and minor concentration areas. Admission to graduate standing in the proposed major and minor must be approved by the area chairman.
- C. A thesis topic shall be chosen and approved on those degree programs involving the thesis.
- D. The keyboard proficiency examination shall be taken.

III. Prerequisites for graduation.

- A. A student with a concentration in applied music must successfully complete an audition for his public recital and shall perform that recital. The performer's certificate may be awarded outstanding students who qualify.
- B. A student of whom a thesis is required shall submit an acceptable thesis.
- C. The comprehensive examination/s shall be taken and passed.

Graduate entrance examinations in music theory and music history are generally held on the day preceding graduate registration for the fall, spring, and summer sessions.

Complete details of this outline may be had by writing the Director of the Graduate Program, Department of Music.

6111. **Baroque Music. (3).**

The age of the basso continuo, 1580-1750; opera and oratorio, instrumental forms, keyboard music, and performance practices. PREREQUISITE: Permission of the instructor.

6112. **Classic Music. (3).**

Rococo and Pre-classic music in England, France, Italy, Spain and Germany. The Viennese classical tradition. PREREQUISITE: Permission of the instructor.

6113. Romantic Music. (3).

The development of romanticism in music from late Beethoven through Bruckner. PREREQUISITE: Permission of the instructor.

6143. Problems in Editing (Notation). (1-3).

The preparation of performance editions from facsimilies of early prints of manuscripts involving the transcription of keyboard or lute tablatures or early mensural notation. (May be repeated for credit.) PREREQUISITE: Permission of the instructor.

6144. Problems in Editing (Continuo Realization). (1-3).

The preparation of performance editions from film or facsimilie of seventeenth and eighteenth century ensemble and solo music requiring an edited keyboard part. (May be repeated for credit.) PREREQUISITE: Permission of the instructor.

6201. Special Problems in the Teaching of Music. (3).

This course provides for class or individual study of the problems and opportunities faced by the person who teaches music in the schools, for classroom teachers, music teachers and supervisors, principals, and administrators. May be repeated for credit but not for the purpose of improving the grade originally earned. May not exceed six semester hours of credit. PREREQUISITE: Permission of the instructor/major adviser.

7000. Bibliography and Research Methods. (3).

A survey of the fields of historical and systematic investigation in music with bibliographical studies and research analysis.

7010. Graduate Ensemble. (1).

Graduate students will be required to participate in ensemble during each semester in residence (a minimum of two credits required for graduation). Specific ensemble assignments will be made by the faculty adviser in charge of the program.

The performer's certificate may be awarded outstanding students who qualify.

7020. Composition. (2).

See MUSC 7030 for the description of this course.

7030. Composition. (3).

Free composition in all forms. Applicants to this course are required to submit original works in various forms and media as proof of maturity and technical preparation for graduate work. The course number may be repeated with the instructor's permission for successive semesters.

7031. Theory I. (3).

A study of styles of the sixteenth, seventeenth and eighteenth centuries.

7032. Theory II. (3).

A study of classic, romantic, impressionistic and modern styles.

7033. Pedagogy of Theory. (3).

A practical course in classroom procedure. Demonstrations by students and instructor in teaching the rudiments, elementary and advanced theory, various styles of counterpoint, and ear training. A study of various theoretical systems. Bibliography.

7034. Analytical Techniques. (3).

Techniques of analysis of style and structure of music from all periods of the history of music.

7035. Advanced Ear Training. (3).

Harmonic, contrapuntal, and melodic dictation drawn from masterworks of composers from Haydn to the present. Employment of all clefs. Sight singing.

7036. Advanced Orchestration. (3).

Investigation of orchestration practices of the great composers from the classical period to the present. Sections of non-orchestral works by representative composers will be orchestrated in the style of the period of their composition.

7037. Acoustics of Music. (3).

Designed to acquaint the student with the physical properties of sound, their relations to instrumental sound production, and the effect of architecture and interior design upon sound and especially upon musical performance.

7060. Composition. (6).

See MUSC 7030 for the description of this course.

7131. Medieval Music. (3).

The history of music from classical antiquity to c. 1400.

7132. Renaissance Music. (3).

The history of music from 1400 to 1600.

7136. Music in the Twentieth Century. (3).

The history of music from the turn of the century to the present.

7137. Studies in Music History. (3).

May be repeated for credit when topics vary. Topics may be selected from the following: Sonata History; Opera History; 19th Century Art Song; The Polyphonic Mass to 1800; Cantata History; Symphony History; Brahms; Mozart; Bach; Beethoven; Debussy-Ravel; Schoenberg-Stravinsky.

7230. Musical Aesthetics and Music Education. (3).

The theories of philosophers, psychologists and musicians from antiquity to the present time related to the justification, values and practices of music education in everyday life.

7231. Advanced Conducting. (3).

Conducting the concert band, the symphony orchestra, and the chorus in the larger musical forms. Emphasis on interpretation. PREREQUISITE: Permission of Instructor.

7233. Choral Literature and Techniques. (3).

A survey of choral literature from Dunstable to the present, using scores, records, and class performance. Analysis of the scores in terms of style, form, and performance problems. Techniques of teaching and conducting unfamiliar styles.

7234. Instrumental Literature and Techniques. (3).

Specific and intensive research in each student's major instrument, covering (1) history of the instrument, (2) texts, methods and periodicals, (3) orchestral studies, (4) solo and ensemble literature, and (5) listening and performance.

7235. History and Philosophy of Music Education. (3).

An examination of the historical and philosophical foundations which underline the curricular and instructional programs in music.

7236. A Survey of Research in Music Education. (3).

Designed to acquaint students with what is happening in theoretical and practical field research, including studies in psychology of music; to hypothesize and develop potential research problems.

7237. Curriculum Development for Music in the Elementary School. (3).

The study and appraisal of curricula plans and materials for the sequential development of musical learnings in children; contemporary techniques for implementing; relationships to other areas of instruction.

7238. Curriculum Development for Music in the Secondary Schools. (3).

The study of general and specialized curricula in the junior and senior high school; their interrelationships and specific goals in the light of musical growth in the adolescent years.

7239. Tests and Measurements in Music Education. (3).

The investigation of evaluative tools in music education; formulation and utilization of measurement devices in music teaching and research.

7240. Administration and Supervision of Music. (3).

An integrating course which involves the administrative considerations basic to all facets of music education programs, K-12. Objectives, organization, staffing, financing, facilities, public relations, Federal programs.

7241. Internship in Music Administration and Supervision. (3).

An advanced laboratory experience for the student, with assignment to a school system in the area where he will serve as an assistant to the local Director of Music. A continuous evaluation of his experience will be effected and recorded through weekly seminars under the direction of a faculty member of the Division of Music Education.

7242. Projects in Elementary Music Curriculum Development, Implementation and Supervision. (3).

An in-depth course employing the processes of lecture, seminar, and practicum. Basic curriculum principles; program planning and development; preparation and presentation of courses in selected classrooms; evaluation.

7243. Projects in Secondary Music Curriculum Development, Implementation and Supervision. (3).

Similar to 7242. Provision for individual projects in choral or instrumental areas.

7430. The Church and Music Education. (3).

A comprehensive program constructed to enable a church musician to present programs, study courses and musical activities designed specifically to educate the tastes of various congregations at all age levels. **PREREQUISITE:** Graduate standing in music.

7431. Oratorio and Cantata. (3).

A study of the larger musical forms of the Church with performances by performing majors. An analytical study of style in performance and in content with suggested use of instruments in addition to the organ. **PREREQUISITE:** Graduate standing in music.

7432. Church Music Arranging. (3).

A course designed to train the student in the devices of creating anthems from hymn-tunes, some choral arranging for special church needs, and instrumentation for ensembles which would be added to the fundamental use of the organ. Useful in creating Biblical musical productions for service and festival occasions. PREREQUISITE: Graduate standing in music.

7830. Independent Study in Opera and Musical Theatre Production. (3).

A detailed study of opera and musical theatre production to include: choosing of repertoire, translations, budget planning, casting, obtaining of materials, and promotion. Practical experience in the technical aspects of opera and musical theatre. (May be repeated for credit.) PREREQUISITE: Permission of instructor.

7831. Opera Repertory I. (3).

A study of operatic repertory from its beginning through the operas of Rossini and Donizetti. Particular emphasis will be given to roles suitable for the voice category of the individual student.

7832. Opera Repertory II. (3).

A study of operatic repertory beginning with Verdi and continuing to present time. Emphasis will be given to roles suitable for the voice category of the individual student.

7833. Vocal Pedagogy I. (3).

Processes in voice production, respiration, phonation, articulation, resonance. Psychological, physiological, and acoustical problems. Voice classification, quality, diction, breath support, breath control.

7834. Vocal Pedagogy II. (3).

A study of different approaches to the teaching of voice including the observation of faculty members instructing students. Assignment of students to each member of the class for supervised teaching. PREREQUISITE: Music 7833.

7835. Independent Project in Opera Direction. (3).

Actual staging or musical direction of an opera workshop or opera theatre production. (may be repeated for credit) PREREQUISITE: Music 7830 and permission of instructor.

7921. Chamber Music. (2).

An elective course in the performance of music in various styles, periods, and media. Open to pianists, instrumentalists, and singers with technical proficiency equivalent to undergraduate senior level. Public performance required each semester.

†7994. Recital. (3).

Required of the applied music major. Application for credit for the recital must be filled out on an approved form after consultation with the major adviser and filed with the Dean of the Graduate School.

†7995. Lecture Recital. (3).

Required of vocal pedagogy majors. Application for credit for the recital must be filled out on an approved form after consultation with the major adviser and filed with the Dean of The Graduate School.

†7996. Thesis. (3-6).

Required of the music history, music theory and composition majors. The composition or compositions should be of suitable nature to provide for practical performance in public recital or concert. Application for credit for the thesis must be filled out on an approved form after consultation with the major adviser and filed with the Dean of The Graduate School.

APPLIED MUSIC

- 6320. Brasses, Individual Lessons. (2).*
- 6420. Organ, Individual Lessons. (2).*
- 6520. Percussions, Individual Lessons. (2).*
- 6620. Piano, Individual Lessons. (2).*
- 6720. Strings, Individual Lessons. (2).*
- 6820. Voice, Individual Lessons. (2).*
- 6920. Woodwinds, Individuals Lessons. (2).*
- 7320. Brasses, Individual Instruction. (2).
- 7420. Organ, Individual Instruction. (2).*
- 7520. Percussions. Individual Instructions. (2).*
- 7620. Piano. Individual Instruction. (2).*
- 7720. Strings. Individual Instruction. (2).*
- 7820. Voice. Individual Instruction. (2).*
- 7920. Woodwinds. Individual Instruction. (2).*
- 7340. Brasses. Individual Instruction. (4).*
- 7440. Organ. Individual Instruction. (4).*
- 7540. Percussions. Individual Instruction. (4).*
- 7640. Piano. Individual Instruction. (4).*
- 7740. Strings. Individual Instruction. (4).*
- 7840. Voice. Individual Instruction. (4).*
- 7940. Woodwinds. Individual Instruction. (4).*
- 7360. Brasses. Individual Instruction. (6).*
- 7460. Organ. Individual Instruction. (6).*
- 7560. Percussions. Individual Instruction. (6).*
- 7660. Piano. Individual Instruction. (6).*
- 7760. Strings. Individual Instruction. (6).*
- 7860. Voice. Individual Instruction. (6).*
- 7960. Woodwinds. Individual Instructions. (6)*

APPLIED MUSIC (INDIVIDUAL LESSONS)

FEES: See page 53 of this bulletin. Fees are paid to the University at the office of the Business Manager.

CREDITS AND GRADES: Every graduate degree with a major or minor in music must include either a recital or a thesis. A full hour lesson will be given all persons enrolled in graduate applied music, regardless of credit-hours awarded. Music Education majors, applied music minors, and applied music electives will be allowed to register for two hours of credit only. Applied majors may register for two to six hours of credit, as permitted. Grades are awarded in accordance with the jury system and have the same significance as in any other subject. All graduate applied music juries shall be scheduled for fifteen minutes.

REGISTRATION: Students will register for individual lessons at the same time and in the same manner that they register for other courses.

*May be repeated for credit in subsequent semesters, but not for the purpose of improving the grade originally earned.

†Grades of S, U, or IP will be given.

PHILOSOPHY

PROFESSOR WILLIAM BRYAN BARTON, JR., *Chairman*

Room 319, Clement Hall

The program of graduate study leading to the M.A. degree has been designed to provide the student with a broad base in the standard branches of philosophy, with specialized work at the advanced level in Metaphysics, History of Philosophy, Epistemology, Logic, Ethics, Aesthetics, Philosophy of Religion, Philosophy of Science, Philosophy of Language, and Political Philosophy.

PREREQUISITES: An undergraduate degree with a minimum of 18 semester hours in philosophy including courses in logic, ethics, and the history of philosophy. Students who lack the proper prerequisites may be admitted to the graduate program only on the condition that they take the appropriate undergraduate courses as soon as possible.

REQUIREMENTS: (1) A total of 33 semester hours for the student who elects not to write a thesis; (2) A total of 30 semester hours for the student who writes a thesis, 21 of which must be in philosophy and 18 of which in courses designated primarily for graduate students. No more than six hours may be credited for thesis. (3) A comprehensive written examination covering work taken at the graduate level. (4) A reading knowledge of a foreign language in which there is a significant body of literature relevant to the student's research interests. The language requirement may be waived if it is not essential to a student's program. (5) If a thesis is written, this will be under the supervision of a member of the graduate faculty. An oral defense of the thesis before a committee composed of the graduate faculty. The completed thesis must be submitted at least one month before graduation.

6011. Theory of Knowledge. (3).

A critical study of the basic problems of epistemology, with readings in the important philosophers.

6021. Metaphysics. (3).

An analysis of the basic metaphysical concepts and a critical study of old and new theories of the nature of being.

6031. Hegel. (3).

A detailed investigation of some of Hegel's most influential works. **PREREQUISITES:** Philosophy 3311 and two additional courses in philosophy.

6372. The Philosophy of Kant. (3).

An intensive study of the major philosophical works of Immanuel Kant with special attention given to *The Critique of Pure Reason* and to the relation between Kant's critical philosophy and his ethics, aesthetics, and philosophy of religion.

6421. Philosophy of Mind. (3).

A critical evaluation and study of contemporary resolutions of the mind-body problem. Account will be taken of modern theories of perception, intentionality, affective and cognitive states, and related issues from the fields of learning theory, phenomenology and depth psychology.

6422. The Rise of Analytic Philosophy. (3).

The development of the views of analytic philosophers from Russell and Wittgenstein to Ayer, Wisdom, and others.

6431. Recent Problems in the Philosophy of Language. (3).

A study is made of the basic characteristics of scientific language; the problems of meaning and existence are given close attention.

6441. Phenomenology and Its Historical Background. (3).

A reading and discussion of basic texts in translation of Husserl's *Ideas*, *Cartesian Meditations* and from the *Crisis of European Science and Phenomenology*.

6632. Advanced Logic. (3).

The nature of axiomatic systems, techniques of formalization, and the logical foundations of mathematics.

7042. Ontology. (3).

A comparative analysis of various ontological and cosmological systems together with an investigation of the nature of metaphysical explanation.

7043. Seminar in The History of Modern Philosophy. (3).

An intensive study of some major figure or group of figures in the development of the history of modern philosophy. The content of this course in any particular semester will be announced in the class schedule. May be repeated for credit if not to improve grade.

7051. Seminar in Systematic Philosophy. (3-6).

An intensive study of one philosophical problem or group of related problems not covered in other graduate seminars. The content of this course in any particular semester will be announced in the class schedule. May be repeated for credit if not to improve grade.

7241. Seminar on the Pre-Socratic Philosophers. (3).

A study of the development of philosophy from the Ionians to the Sophists with a discussion of the various historical interpretations of the period.

7242. Seminar on Plato and Aristotle. (3).

An intensive reading of Plato's later dialogues and parts of Aristotle's *De Anima*, *Physics*, and *Metaphysics*.

7531. Problems in Moral Philosophy. (3).

An analysis of the work of leading contemporary ethical theorists with a discussion of such problems as the naturalistic fallacy, the logic of moral discourse, moral skepticism, the distinction between ethics and metaethics, etc.

7541. Social and Political Philosophy. (3).

An examination of some of the major speculative and critical philosophies of society and the state with attention to such problems as the philosophical foundations of the social sciences, the nature of political authority, rights, obligations and related problems.

7641. Axiomatics. (3).

A study of the nature of deductive systems; modern postulation methods; classes; properties of relations; proofs of consistency; completeness and independence.

7671. Philosophy of Science. (3).

Lectures, organized discussions and reports, centering around contemporary problems of analysis of scientific methods, arguments, terms, and their social and philosophical consequences.

7721. Aesthetics. (3).

A study of the fundamental issues in aesthetics through an examination of the important classical and contemporary theories of art.

7731. Philosophy of Religion. (3).

A critical evaluation of various rational and empirical philosophies of religion. The idea of a philosophical theology and its relation to such problems as the nature of religious language, religion and science, reason and revelation, will be examined.

†7994. Reading and Research. (3,3).

Individual supervision under a member of the graduate faculty on a topic within the student's major field of interest.

†7996. Thesis. (3-6).

†Grades of S, U, or IP will be given.

PHYSICS

PROFESSOR CARROLL IJAMS, *Chairman*

Room 216, Manning Hall

Students majoring in Physics for the Master of Science Degree are required to present as a prerequisite 20 semester hours of undergraduate physics courses including upper division Mechanics, Electricity and Magnetism, and approved Mathematics courses in Calculus and Differential Equations.

After meeting the general degree requirements for admission to The Graduate School, students selecting Physics as a major subject will be assigned to the Graduate Committee who must approve and direct their course of study.

With permission of the Graduate Committee, the student may pursue either a thesis or non-thesis program. In either program a comprehensive examination must be satisfactorily completed before being recommended for graduation.

If the thesis program is selected, the following minimum requirements must be satisfied.

- (1) 18 semester hours of physics courses numbered 7000 or above, including Physics 7100, 7200, 7300, 7520, and 7996.
- (2) Sufficient additional courses to satisfy a minimum of 30 semester hours of work in which 9 may be in a collateral field of study.

If the non-thesis program is selected, the following minimum requirements must be satisfied.

- (1) 21 semester hours of physics courses numbered 7000 or above, including Physics 7100, 7200, 7300, and 7520.
- (2) Sufficient additional courses to satisfy a minimum of 33 semester hours of work in which 9 may be in a collateral field of study.

6051. Astrophysics. (3).

Application of radiation laws to the interpretation of stellar structure. Introduction to radiative transfer in atmospheres. The spectral and luminosity classification of stars, stellar populations and evolution.

Three lecture hours and occasional observation periods per week.

6052. Astrophysics. (3).

A continuation of Physics 6051, with emphasis on interstellar matter, stellar systems, galactic structure radio astronomy.

Three lecture hours and occasional observation periods per week.

6110. Nuclear Physics. (3).

Properties of atomic nuclei, radioactive transitions, alpha, beta and gamma decay. Binding energy, nuclear forces and nuclear models.

6211. Optics. (4).

Geometrical and physical optics including such topics as thin lenses, spherical mirrors, lens aberrations, optical instruments, waves interference, diffraction, absorption, transmission, and scatterings. PREREQUISITE: Physics 3212; Mathematics 2322.

Three lecture, three laboratory hours per week.

6410. Introduction to Quantum Theory. (3).

Experimental basis of quantum theory; development of the Schrodinger equation and its solution of simple systems; selected applications in atomic and molecular structure.

Three lecture hours per week.

6510. Thermodynamics. (3).

A mathematical treatment of thermodynamics, including such topics as work, energy, enthalpy, entropy, reversible and irreversible processes, equilibria, specific heats, and phase transitions. RECOMMENDED COREQUISITE: Physics 3112 or 3212.

Three lecture hours per week.

6610. Solid State Physics. (3).

Consideration of such topics as lattice vibrations, specific heats, electrical and thermal conductors, in solids, magnetism.

Three lecture hours per week.

6710. Spectroscopy. (3).

Atomic and molecular structure as revealed by the study of radiation emitted and absorbed by substances. Emphasis is on the vector model of the atom and an introduction to infrared and Raman spectra of molecules.

6911. Introduction to Theoretical Physics. (3).

Special mathematical techniques used in the theoretical treatment of physical phenomena, boundary value problems, matrices, Fourier series and integrals, etc, as applied to advanced physical theory.

6912. Introduction to Theoretical Physics. (3).

Continuation of Physics 6911. PREREQUISITE: Physics 6911.

7010. General Physics for High School Teachers. (3).

The course is designed to cover the basic and fundamental concepts of mechanics, heat, and sound. These topics will be covered by lecture, demonstrations, and actual laboratory experiments. The principal objective of the course will be to strengthen the background of science teachers. Credit for this course does not apply toward a major or minor in chemistry or physics.

7020. Fundamental Concepts of Contemporary Physics for High School Teachers. (3).

The course material will include many of the newer topics emphasized in the modern high school texts actually in use today. Electronics, the newer phases and concepts of electricity and magnetism, x-rays, radioactivity, and the basic principles of atomic and nuclear physics will be covered. The principal objective of the course will be to strengthen the background of science teachers. Credit for this course does not apply toward a major or minor in chemistry or physics.

7030. Selected Topics in Modern Physics for High School Teachers. (3).

Some of the more advanced topics of atomic and nuclear physics, together with the basic concepts of solid state physics, electronics, and space technology will be presented. Laboratory experience with some of the more advanced electronic and nuclear equipment will be provided. A background in basic physics is recommended as a prerequisite.

Three lecture hours per week.

7040. Mathematical Physics. (3).

A survey of mathematical methods employed in advanced physics on the graduate level. Fourier analysis, complex variables, special function, Eigenvalues, tensor analysis, Green's functions and similar topics will be included, with emphasis upon their application to both theoretical and experimental physics courses.

7041. Mathematical Physics. (3).

A continuation of Physics 7040.

7050. Special Topic in Physics. (3-6).

A course designed to include selected topics of interest and importance in advanced Physics. Individual investigation and reports under the guidance of the major adviser will constitute a major part of the course. Extensive use of the technical library facilities of the area and of staff. This course may be taken for a maximum of six semester hours graduate credit.

7060. Fundamental Concepts of Plasma Physics. (3).

This course consists of such topics as phase space and distribution functions, hydrodynamic equations, interaction of electromagnetic waves with plasmas, magnetic and kinetic pressures, the Debye length, collisions and radiation, longitudinal oscillations of plasma elements, diffusion mobility and transport phenomena, the pinch effect, and velocity-space plasma instabilities.

7100. Classical Mechanics. (3).

An analytical study of mechanics of particles and rigid bodies by Lagrange's, Hamilton's and Hamilton-Jacobi methods. The special theory of relativity, canonical transformation, and Poisson brackets are among the concepts emphasized.

7101. Classical Mechanics. (3).

A continuation of Physics 7100. PREREQUISITE: Physics 7100.

7200. Advanced Quantum Mechanics. (3).

Introduction to the concepts and formalism of relativistic quantum mechanics and quantum field theory. A detailed study of the concepts and formalism of Heisenberg formulation, perturbation theories, spin and angular momentum and relativity.

7201. Advanced Quantum Mechanics. (3).

A continuation of Physics 7200. PREREQUISITE: Physics 7200.

7300. Electrodynamics. (3).

An advanced course in electricity and magnetism. Topics include fields and potentials, energy methods, steady currents and magnetic materials, Maxwell's equations and electromagnetic waves.

7301. Electrodynamics. (3).

A continuation of Physics 7300. Topics include relativity, and the covariant formulation of electrodynamics, radiation theory, and retarded potentials. PREREQUISITE: Physics 7300.

7520. Statistical Mechanics. (3).

Elements of kinetic theory and applications to gases, specific heats, magnetism, etc. Partition functions, introduction to Boltzmann statistics and quantum statistics. Modern theories of statistical data interpretations.

Three lecture hours per week.

7610. Advanced Topics in Solid State Physics. (3).

Introduction to the quantum theory of solids. Band theory, magnetism, superconductivity, lattice dynamics, and other advanced topics.

7710. Advanced Topics in Optical Spectroscopy. (3).

Advanced topics in atomic and molecular spectroscopy, including the interaction of optical radiation with matter, the transition probabilities, hyperfine structure, applications of group theory to spectroscopic problems.

†7996. Thesis. (6).

The original investigation of an assigned problem in the area of graduate study to be carried out under the supervision of a qualified member of the staff. This investigation will furnish the material for a thesis. Scientific articles, progress reports, and special problems of interest are reviewed and discussed by the student in seminars each semester. A maximum of six semester hours credit is allowed toward a master's degree.

†Grades of S, U, or IP will be given.

POLITICAL SCIENCE

PROFESSOR WILLIAM R. NELSON, *Chairman*

Room 419, Clement Hall

Graduate students will consult their adviser in the Department of Political Science as to the program of study. The basic requirements are as follows:

MASTER OF ARTS DEGREE

Prerequisites: A minimum of 18 semester hours in Political Science, except in special cases approved by the Chairman of the Department.

Degree Requirements:

- (1) A total of 30 semester hours in graduate courses with a thesis or 33 semester hours in graduate courses without a thesis. Students will consult with their adviser as to whether to write a thesis. The student electing to write a thesis will register for 6 semester hours of Political Science 7996, Thesis.
- (2) Satisfactory completion of Political Science 6101, Scope and Method of Political Science Research, or an equivalent course.
- (3) At least 18 semester hours of the courses must be taken at the 7000 level.
- (4) Satisfactory performance on a comprehensive examination.
- (5) With the approval of the adviser, up to 9 semester hours of courses may be taken in a collateral area.

MASTER OF PUBLIC ADMINISTRATION DEGREE

Prerequisite: A suitable record of preparation in the social sciences or in business courses. Students with inadequate preparation may be admitted and the deficiencies removed without graduate credit.

Degree Requirements:

- (1) A total of at least 33 semester hours in graduate courses.
- (2) Satisfactory completion of the following core curriculum:
 POLS 7601—Proseminar in Public Administration
 POLS 6602—Public Finance Administration
 POLS 6603—Public Personnel Administration
 POLS 7605—Seminar in Politics and Administration
- (3) Satisfactory completion of POLS 7610, Internship Seminar in Public Administration, unless the student has had appropriate administrative experience.
- (4) At least 18 semester hours of the courses must be taken at the 7000 level.
- (5) Completion of a concentration of courses in one of the following areas:
 General Public Administration
 Urban Management and Planning
 Comparative and Development Administration
- (6) Satisfactory performance on a comprehensive examination.
- (7) The Master of Public Administration is an interdisciplinary degree and students may be required to take up to 12 semester hours of their work outside of the Department of Political Science, depending upon their area of interest and the nature of their undergraduate preparation.

6101. Scope and Method of Political Science Research. (3).

Examination of the basic concepts, theories, and methods of modern political analysis and the application of various research techniques such as sample survey, statistical tests, data processing, and computing to the study of political behavior.

6102. Political Behavior. (3).

An introduction to the contributions of the behavioral sciences to an understanding of the political system. Political behavior is examined as manifested in the formation of attitudes, public opinion, group organization, and political power.

6103. Political Socialization. (3).

A study of the process whereby political attitudes and values are passed from one generation to the next and altered in transmission. Includes the quantitative measurement of political attitudes.

6211. Constitutional Law. (3).

An analysis of the relationships and controls of the three branches and the nature of the division of power between the nation and the states, with emphasis on the role of the Supreme Court as the arbiter in the constitutional system.

6212. Civil Rights and the Constitution. (3).

An examination of the judicial interpretation of political and civil rights with emphasis on the period since 1945.

6213. Development of United States Domestic Policy. (3).

A study of the formation and execution of selected domestic policies (fiscal, economic, agriculture and conservation, welfare, grants-in-aid) with a detailed examination of the political and administrative environment of governmental decision making.

6214. The Executive Process. (3).

A detailed study of the role of the executive in American politics.

6215. The Judicial Process. (3).

An examination of the structure of the legal system and the role of the judiciary in government and politics. Emphasis is on the American legal system and the factors which enter into judicial decision-making including political, social, economic, and psychological factors.

6216. Public Opinion and Interest Groups. (3).

A study of the formulation of political attitudes and opinions. Special emphasis is placed upon the role played by interest groups in the formulation of public opinion. Includes an analysis of selected groups and their tactics.

6217. The Legislative Process. (3).

The origins, organization, functions, and activities of the modern legislature; making laws, supervising the administration, representing and informing the people.

6221. Urban Development Administration. (3).

Problems and issues in the administration of economic, social, and political development; planning, organizing, and programming of change, technical assistance, and resource administration.

6224. Urban Problems. (3).

A study of selected problems in urban administration, politics, and policies.

6230. Legislative Internship. (3-6).

Supervised internship working with the Tennessee General Assembly or other legislative bodies on current legislative programs. Seminar sessions are held to discuss and analyze the problems with which the interns are working.

- 6301. British Government and Politics. (3).**
The nature and development of the British Constitutional system. Special emphasis will be placed on the Cabinet, Parliament, and the Commonwealth organization and function.
- 6302. The Politics of Developing Nations. (3).**
A comparative study of the patterns and problems of political development in the emerging nations.
- 6304. Government and Politics of France. (3).**
The governmental institutions and political processes of France, with emphasis upon the formulation of public policy.
- 6305. Soviet Government and Politics. (3).**
Organization and function of the authoritarian state, with emphasis on the role of the Communist Party and ideology.
- 6306. Contemporary Latin American Politics. (3).**
A study of contemporary problems in Latin American politics and inter-American relations.
- 6307. Government and Politics of Communist China. (3).**
A study of the institutions of government, the political process, political elites, political groups and political socialization of Communist China.
- 6308. Government and Politics of Germany. (3).**
The governmental institutions and political processes of Germany, with emphasis upon the formulation of public policy.
- 6401. Modern Political Ideologies. (3).**
A study of authoritarianism and democracy as represented by a comparison of democracy, socialism, communism, and fascism.
- 6403. Contemporary Protest Thought. (3).**
Political theories of black protest, the new left, and the far right.
- 6405. American Political Thought. (3).**
An analysis of political thought in the United States from the colonial to the present time, with emphasis placed on the relation between political thought and political institutions and practices.
- 6407. Black Political Thought. (3).**
An analytical survey of black political thought from the colonial period to the present. Emphasis is placed upon recent and contemporary thought.
- 6501. Contemporary Problems in International Politics. (3).**
A study of contemporary problems in international relations with emphasis on the major powers.
- 6502. Soviet Foreign Policy. (3).**
Basic concepts about Soviet foreign policy; development and techniques; present patterns of Soviet relations with key nations; major problems in future relationships.
- 6503. Inter-American Relations. (3).**
Study of diplomatic relations among the nations of Latin America and with the United States. Regional organizations and relations with Cuba are given special attention.

6504. International Law. (3).

An analysis of the nature, scope, duties, rights, and evolutionary trends of international law.

6505. Comparative Communist Systems. (3).

A cross-national comparison of the adaptation of ruling and non-ruling communist parties to different political environments. Includes examination of inter-party and the intra-block relations.

6506. Problems in American Foreign Policy. (3).

A study of American foreign policy problems taken from specific areas or issues of policy.

6508. Theories and Concepts in International Politics. (3).

A survey of theoretical approaches to the study of international politics. Special attention is given to methodology, models, and international political simulation.

6602. Public Finance Administration. (3).

Detailed study of administrative and political problems of fiscal policy, the budgetary process, and fiscal controls.

6603. Public Personnel Administration. (3).

The study of policies, methods, and techniques utilized in public personnel administration. Special attention is given to problems reflecting contemporary demands upon personnel organizations. The capacity to analyze problems, select the most effective means of dealing with them and plan appropriate courses of action is developed through case example.

6604. Problems of Public Administration. (3).

An investigation of selected problems in the administration of public functions, with emphasis upon contemporary developments.

6611. Administrative Law. (3).

Study of the role and nature of administrative law, including procedural requirements and judicial review of administrative actions and the liability of the government for torts and breach of contract.

7106. The Political System. (3).

A systematic analysis of the elements of the political system, showing the interrelationship of political culture (values, beliefs, attitudes, consensus), the formal and informal patterns of power, the patterns of interest, and the pattern of policy.

7201. Seminar in U. S. Political Institutions and Thought. (3).

A study of the development of major political institutions and thought.

7212. Seminar in Constitutional Problems. (3).

Study of selected problems in contemporary constitutional law.

7216. Seminar in Political Behavior. (3).

An examination of the theories, methods, and the findings of the behavioral approach in political science.

7224. Seminar in Urban Problems. (3).

A consideration of the problems inherent in the growing urban developments in the United States. The governmental organization of metropolitan areas and the difficulties of coordination of government functions. Proposed remedies and the reception of new approaches in selected metropolitan areas.

7225. Seminar in Problems in State Government. (3).

Selected policy making processes and policy problems arising from the operation of legislative, administrative, and judicial machinery. Special attention will be given to Tennessee.

7301. Seminar in Comparative Political Institutions and Thought. (3).

Comparative study of the development of political institutions and thought in major world government.

7302. Seminar in Comparative Politics. (3).

Study of selected problems in comparative politics.

7401. Seminar in Political Theory. (3).

Study of selected topics involving the development of political thought.

7501. Seminar in International Politics. (3).

A study of selected problems in international politics.

7601. Proseminar in Public Administration. (3).

A survey focusing on the significance of public administration to policy processes and governmental effectiveness. Includes administration and politics; organization structure and behavior; and patterns of management and decision-making. Designed for students who do not have undergraduate preparation in public administration.

7605. Seminar in Politics and Administration. (3).

Explanation of problems stemming from the relationships of politics and administration, stressing relevant analytical approaches and research methods.

7608. Comparative Public Administration. (3).

Seminar on the comparative ecology of administration in selected countries. Analysis of similarities and differences in administrative structures and functions in developed and developing nations; practicalities of cross-cultural transferability of administrative concepts and processes.

7610. Internship Seminar in Public Administration. (3-6).

Supervised internship working with cooperating government agencies and with the Institute of Governmental Studies and Research on current problems of public administration. Seminar sessions are held to discuss and analyze the problems with which the interns are working. PREREQUISITE: Permission of the department.

7615. Special Problems. (3).

May be repeated for a total of six credits. Independent investigation of a research problem or directed readings in a selected area of political science. PREREQUISITE: Permission of instructor.

†7996. Thesis. (3-6).

The student must write and defend satisfactorily a thesis on a subject approved by his major professor.

† Grades of S, U, or IP will be given.

PSYCHOLOGY

PROFESSOR ROBERT VIDULICH, *Chairman*

Room 202, Psychology Building

The graduate major in psychology may specialize at the Master's level in General Psychology or Clinical Psychology. At the doctoral level, specializations are available in Clinical Psychology, Experimental Psychology (with sub-specialties in Biopsychology, Learning-Behavior Analysis, and Sensory Processes), or in Human Psychology (with sub-specialties in Human Development-Mental Retardation, Industrial Psychology, Personality-Cognitive Processes, and Social Psychology). Additional inter-area sub-specialties are offered in Neuropsychology, and in Behavior Management.

In the Department of Psychology, permission to pursue a Master's degree is granted on a competitive basis. In order to be considered for master's work, the applicant should meet the following prerequisites:

1. An overall undergraduate grade-point average of at least 2.5 (out of 4.0). Applicants with undergraduate records at this minimum level are not ordinarily admitted. Strong supporting guidance will be required of such applicants.
2. A minimum of 18 semester hours in undergraduate psychology courses, including Quantitative Methods, Learning, and Experimental Psychology. A student lacking these prerequisite courses but presenting an exceptional undergraduate record may be granted graduate admission and should remove the deficiencies as early as possible. In other cases, an applicant may be admitted as a special student, his application for graduate status being deferred until the deficiencies are removed.
3. Satisfactory performance on the aptitude section of the Graduate Record Examination.
4. Letters of recommendation from at least two persons familiar with the applicant's background and aptitude for graduate work.

In the Department of Psychology, permission to pursue the Ph.D. degree is also selectively granted on a competitive basis. In order to be considered for advanced graduate work in the Ph.D. program, the applicant must meet the following requirements:

1. Have satisfactorily completed all requirements for the Master of Science degree in Psychology at Memphis State University, or hold an equivalent master's degree from another institution. No applicant will be considered for the Ph.D. program who holds a non-thesis degree until he has completed, at Memphis State University, the additional requirements of this Department for the M.S. degree. Outstanding prior work in graduate studies will be expected of all applicants.
2. Satisfactory performance on the aptitude section of the Graduate Record Examination.
3. Letters of recommendation from at least three persons familiar with the applicant's academic background and aptitude for advanced graduate work.

The student granted graduate status should consult his graduate faculty advisory committee to determine his program of study. The student may work toward the M.A. Degree or the M.S. Degree in Psychology, the choice of degree programs depending on the student's interests and goals. The student pursuing the M.A. or M.S. Degree in Psychology is urged to complete all his work for the degree in the Department of Psychology, though under special circumstances he may take a collateral in an area approved by his advisory committee.

7101. History and Systems of Psychology. (3).

An analysis of the philosophical and scientific antecedents of contemporary psychology, including examination of historically and currently important theoretical systems and discussion of problems of conceptualization and theory construction. PREREQUISITES: Psychology 4101 or equivalent, or consent of instructor.

7102. Physiological Psychology. (4).

A comprehensive study of the relationships between physiological processes and behavior. The anatomy and physiology of the nervous system will be reviewed. Major emphasis is on various functional systems such as attention, activation, regulation, and on the topics of learning and memory. PREREQUISITES: Psychology 4201 or equivalent, or consent of instructor.

Three lecture, two laboratory hours per week.

7103. Comparative Psychology. (4).

A comprehensive examination and synthesis of the principles, concepts, and findings of ethology and comparative psychology. Similarities and differences in theories, methods, and research findings related to such basic psychological problems as the effective stimulus, the drive concept, and acquired vs. innate behaviors will be examined. PREREQUISITES: Psychology 4202 or equivalent, or consent of instructor.

Three lecture, two laboratory hours per week.

7104. Psychological Appraisal. (3).

A survey of the empirical foundations of psychological assessment. Research on the interpretation and evaluation of a variety of measurement devices will be reviewed. The role of assessment in the modification of behavior will be discussed. PREREQUISITES: Psychology 3304 or equivalent, or consent of instructor.

7201. Theories of Learning. (3).

Examination and discussion of the major contemporary theories of learning. Attention is given to the basic assumptions, logical structure, and empirical support for the theories of Spence, Skinner, Estes, and Logan. In addition, briefer consideration is given to theories of considerable historical importance such as those of Guthrie, Tolman, and Hull. PREREQUISITES: Psychology 3201 or equivalent, or consent of instructor.

7202. Theories of Personality. (4).

A survey of major contemporary theories of personality, with particular emphasis on the etiology and treatment of psychopathological states as interpreted within various theoretical frameworks. PREREQUISITES: Psychology 3101 or equivalent, or consent of instructor.

7203. Behavior Analysis. (3).

A comprehensive treatment of behavioral principles in their application to simple and complex forms of behavior. The course focuses on operant conditioning of animal behavior and demonstrates the basic behavioral principles at work in their simplest form. These operant conditioning principles are extended to human behavior occurring in the natural environment. Increasingly complex human behaviors are successively introduced. PREREQUISITE: Psychology 3201 or equivalent, or consent of instructor.

7204. Motivation. (3).

A survey of the theoretical and research literature pertaining to the topic of motivation. Consideration of the concepts of instinct, drive and motive, with coverage of both animal and human studies. PREREQUISITE: Psychology 3201 or equivalent, or consent of instructor.

7205. Social Psychology. (4).

A survey of the theoretical and research literature pertaining to current topics in social psychology excluding intra- or inter-group behavior, including attitude formation and change, inter-personal perception and behavior, social motivation, communication and persuasion, and social influence and conformity. PREREQUISITE: Psychology 3302 or equivalent, or consent of instructor.

7206. Group Processes. (4).

Social psychology of groups and organizations, including social influence, leadership, and inter- or intra-group behavior. PREREQUISITE: Psychology 3302 or equivalent, or consent of instructor.

Three lecture, two laboratory hours per week.

7207. Developmental Psychology. (3).

A detailed examination of developmental processes across species. Primary emphasis is placed on the variables contributing to normal development of species-characteristic abilities and patterns of behavior. PREREQUISITE: Psychology 3103 or equivalent, or consent of instructor.

7208. Psychology of Perception. (4).

An examination of the historical development, research, and major theoretical positions in the area of perceptual psychology. Major emphasis is placed on theoretical and experimental treatment of the basic perceptual phenomena. PREREQUISITE: Psychology 4203 or equivalent, or consent of instructor.

Three lecture, two laboratory hours per week.

7209. Sensory Psychology. (4).

A structural and functional examination of the basic sensory systems. The problems of sensory quality and sensory quantity will be investigated with major emphasis on visual acuity, color vision, pitch discrimination, and haptic sensitivity. PREREQUISITE: Psychology 4203 or equivalent, or consent of instructor.

Three lecture, two laboratory hours per week.

7210. Psychology of Learning. (4).

Examination and discussion of current research, and of theoretical and experimental problems in the area of learning and behavior modification. Topics covered include reinforcement, punishment, secondary reinforcement, extinction, motivation, generalization, discrimination, retention, and forgetting. PREREQUISITE: Psychology 7201, or consent of instructor.

Three lecture, two laboratory hours per week.

7211. Cognitive Processes. (3).

Analyses of thinking, conceptualization, language and symbolic activity, and related mediational processes in the individual. PREREQUISITE: Psychology 3303 or equivalent, or consent of instructor.

7212. Industrial Psychology. (3).

The application of psychological principles and findings to industrial settings analyzing personnel selection, classification and evaluation, employee attitudes, morale, and motivation, and psychological factors in work. PREREQUISITE: Psychology 3301 or equivalent, or consent of instructor.

7213. Theoretical and Empirical Problems in Psychology. (3).

A detailed survey of the philosophical and logical antecedents and problems in psychology as a science, covering such topics as empirical methods in psychology, psychological data language, theory construction, probability and inference, and inductive procedures. PREREQUISITE: Psychology 7101 or equivalent, or consent of instructor.

7214. Human Factors Psychology. (3).

The course deals with the contribution of psychological research to the design of equipment for efficient human use and operation. Studies of the characteristics and limitations of the human individual which bear upon the equipment best suited to his use. A survey of research on visual and auditory displays, controls, layouts, complex man machine systems and vigilance.

7215. Organizational Psychology. (3).

The course deals with the major organizational determinants of individual and group behavior and performance. The characteristics of organization structure and climate are explored from both a classical and a contemporary viewpoint. Organization change and development theories are examined plus the major ancillary theoretical positions on leadership, individual and group performance, behavior modification, selection and training.

7216. Behavior Management. (3).

Application of the principles of operant-instrumental learning to human behavior in various settings such as educational, rehabilitative and institutional programs. Practical implementation of the principles of behavior analysis and management will be stressed and expected of the student. PREREQUISITES: Psychology 7203 or equivalent, or consent of instructor.

7301. Quantitative Methods. (4).

Statistical inference applied to problems in psychological experimentation. Elementary probability, statistical distributions, classical and nonparametric statistics will be covered. PREREQUISITES: Psychology 2301 or equivalent, or consent of instructor.

Four lecture hours per week.

7302. Research Design and Methodology. (4).

The emphasis will be on mathematical and nonmathematical analyses of psychological data, theoretical and experimental implications of different analyses, various data collection techniques, and types of experimental and statistical control. PREREQUISITES: Psychology 7301, or consent of instructor.

Four lecture hours per week.

7303. Multivariate Analysis. (3).

Partial and multiple correlation, factor analysis, cluster analysis. Practice in applying these techniques, with emphasis on the logic of such statistical techniques for psychology. PREREQUISITES: Psychology 7301, or consent of instructor.

7304. Measurement Theory and Psychometrics. (3).

Measurement theory involved in the construction and evaluation of psychological measuring instruments will be stressed. Particular emphasis will be placed on scaling methods and their use in psychological research and evaluation. PREREQUISITES: Psychology 7301, or consent of instructor.

7305. Research and Data Collection Methods in Human Psychology. (4).

An intensive examination and analysis of methods, techniques and procedures used in the study of human behavior, including interviewing, questionnaires, sociometry, naturalistic observation, and attitude and behavior scaling. PREREQUISITES: Psychology 2301 or equivalent, or consent of instructor.

7308. Behavioral Instrumentation. (3).

Detailed examination of instrumentation techniques in behavioral psychology including specific study of basic electronics appropriate to psychological equipment circuit construction, programming, and stimulus presentation techniques, and to the design and construction of behavioral research equipment. PREREQUISITE: Consent of instructor.

Two lecture, two laboratory hours per week.

7309. Physiological Techniques. (3).

Detailed examination of various techniques used in research in physiological psychology, covering such topics as surgical and histological procedures, cortical lesions and implants, perfusion, and electrophysiological recording. PREREQUISITE: Psychology 7102, or consent of instructor.

Two lecture, two laboratory hours per week.

7310. Programmed Instruction. (3).

The application of principles of reinforcement contingencies to self-instruction devices. Historical development, research findings, programming, and evaluation will be covered. PREREQUISITE: Consent of instructor.

7401. Theories of Psychotherapy. (3).

A comparative examination of the principles and techniques of psychotherapy associated with major theorists in this area. Relevant clinical and experimental research will be surveyed to emphasize the similarities and differences between various approaches. PREREQUISITES: Psychology 7202 and Psychology 7412, or consent of instructor.

7402. Psychodiagnostics I: Intellectual Assessment. (3).

The measurement of intelligence and intellectual deficits. Emphasis on the development and evaluation of, and practice in administering, individual intelligence tests and measures of specific intellectual functions. PREREQUISITES: Psychology 7104, or consent of instructor.

7403. Psychodiagnostics II: Personality Assessment. (3).

An examination of the various psychometric techniques for assessing personality functioning. Objective measures (e.g., MMPI) and projective measures (e.g., Rorschach) will be covered in detail. PREREQUISITES: Psychology 7202 and 7412, or consent of instructor.

7412. Psychopathology. (3).

A survey of the manifestations of abnormal behavior and psychological processes. Detailed analysis of the clinical and experimental literature concerning psychological and psychiatric disorders and their etiology. PREREQUISITES: Psychology 7202, or consent of instructor.

7413. Introduction to Mental Retardation. (3).

A comprehensive introduction to the psychological, genetic, physiological and social aspects of mental subnormality. Consideration of classification systems, syndromes, etiology and prognosis of mental retardation in children and adults. PREREQUISITES: Consent of instructor.

7414. Diagnosis and Treatment of Mental Retardation. (3).

Comprehensive study of interdisciplinary approaches to the diagnosis and treatment of the retardate and other patients with handicapping conditions. Special emphasis is given to consideration of the handicapped child as understood by various professional disciplines concerned. PREREQUISITES: Psychology 7413, or consent of instructor.

†7415. Sensitivity Training. (3).

This course is required for all advanced clinical psychology majors and is a prerequisite to the Clinical Practicum in Psychological Treatment, Psychology 7612. The course is designed to enhance self-awareness and clinical sensitivity through involvement as a participant observer in the development and continuing functioning of a small group. Emphasis will be on emergent styles of interaction in roles, both explicit and implicit, inherent in the group structure. PREREQUISITE: Psychology 7401 or equivalent, or consent of instructor.

Only pass-fail grades will be given, and the credit is not applicable to any degree.

7420. Child Clinical Psychology I: Assessment. (3).

An examination of psychopathology in childhood and adolescence. Emphasis will be upon the assessment and understanding of pathology in clinical practice. Special consideration will be given to psychological techniques used with children. PREREQUISITES: Psychology 7402 and 7403, or equivalent, or consent of instructor.

7421. Child Clinical Psychology II: Treatment. (3).

An examination of a variety of treatment approaches employed with children and adolescents. Emphasis will be given to the practice of psychotherapy with children. PREREQUISITES: Psychology 7420 or equivalent.

7501. Seminar: General Psychology. (3).

(May be repeated for a maximum of 9 credits). Systematic study of current topics in psychology of a general-theoretical nature.

7502. Seminar: Physiological Psychology. (3).

(May be repeated for a maximum of 9 credits). Systematic study of current topics in the field of physiological psychology.

7503. Seminar: Experimental Psychology. (3).

(May be repeated for a maximum of 9 credits). Systematic study of current topic in the field of experimental psychology.

7504. Seminar: Comparative Psychology. (3).

(May be repeated for a maximum of 9 credits). Systematic study of current topics in the field of comparative psychology.

7505. Seminar: Social Psychology. (3).

(May be repeated for a maximum of 9 credits). Systematic study of current topics in the field of social psychology.

7506. Seminar: Clinical Psychology. (3).

(May be repeated for a maximum of 9 credits). Systematic study of current topics in the field of clinical psychology.

7507. Seminar: Industrial Psychology. (3).

(May be repeated for a maximum of 9 credits). Systematic study of current topics in the field of industrial psychology.

7508. Seminar: Mental Retardation. (3).

(May be repeated for a maximum of 9 credits). Systematic study of current topics in the field of mental retardation.

7509. Seminar: School Psychology. (3).

(May be repeated for a maximum of 9 credits). Systematic study of current topics in the field of school psychology.

7510. Seminar: Organizational Psychology. (3).

(May be repeated for a maximum of 9 credits). Systematic study of current topics in the field of organizational behavior.

7511. Seminar: Personality Psychology. (3).

(May be repeated for a maximum of 9 credits.) A systematic study of current topics in personality theory and research.

7512. Seminar: Developmental Psychology. (3).

(May be repeated for a maximum of 9 credits.) Systematic study of current topics in the field of developmental psychology.

7513. Seminar: Neuropsychology. (3).

(May be repeated for a maximum of 9 credits.) Systematic study of current topics in the field of neuropsychology.

†7601. Research Practicum: General Psychology. (1-3).

(May be repeated for a maximum of 9 credits). Individualized advanced laboratory or field research activities in general psychology.

†7602. Research Practicum: Physiological Psychology. (1-3).

(May be repeated for a maximum of 9 credits). Individualized advanced laboratory research activities in physiological psychology.

†7603. Research Practicum: Experimental Psychology. (1-3).

(May be repeated for a maximum of 9 credits). Individualized advanced laboratory research activities in experimental psychology.

†7604. Research Practicum: Comparative Psychology. (1-3).

(May be repeated for a maximum of 9 credits). Individualized advanced laboratory or field research activities in comparative psychology.

†7605. Research Practicum: Social Psychology. (1-3).

(May be repeated for a maximum of 9 credits). Individualized advanced laboratory or field research activities in social psychology.

†7606. Research Practicum: Clinical Psychology. (1-3).

(May be repeated for a maximum of 9 credits). Individualized advanced laboratory or field research activities in clinical psychology.

7607. Research Practicum: Developmental Psychology. (1-3).

(May be repeated for a maximum of 9 credits.) Individualized advanced laboratory or field research activities in developmental psychology.

7608. Research Practicum: Neuropsychology. (1-3).

(May be repeated for a maximum of 9 credits.) Individualized advanced laboratory or field research activities in neuropsychology.

7609. Prepracticum in Clinical Psychology. (1).

This course represent a diversified introduction to the professional aspects of clinical psychology. First year graduate students are taken to various mental health facilities in the community, where they may see psychologists, other professionals, and more advanced students in training and practice. Additionally, a series of lectures provides the history of clinical psychology, and an introduction to professional ethics and issues. **PREREQUISITE:** Consent of instructor.

†7610. Clinical Practicum: Diagnostic Methods. (1-9).

(May be repeated for a total of 9 credits). The advanced clinical psychology student will receive supervised experience in the use of psychodiagnostic techniques in various community settings. **PREREQUISITES:** Psychology 7402 and 7403, or consent of instructor.

†7611. Field Practicum: Social-Industrial Psychology. (1-3).

(May be repeated for a maximum of 9 credits). Seminar discussion and supervised experience in the application of basic psychological procedures and principles to social, personnel, and organizational activities in various industrial, military, and community settings. **PREREQUISITES:** Psychology 7205, or consent of instructor.

†7612. Clinical Practicum: Psychological Treatment. (1-9).

(May be repeated for a total of 9 credits). The advanced clinical psychology student will receive supervised experience in the practice of psychotherapy and behavior modification techniques in various community settings. **PREREQUISITES:** Psychology 7401, or consent of instructor.

†7613. Clinical Practicum: Mental Retardation. (1-9).

(May be repeated for a total of 9 credits). Didactic training and supervised experience in the application of psychological assessment and treatment procedures to persons with mental retardation and related disorders. **PREREQUISITES:** Psychology 7413 and 7414, or consent of instructor.

†7614. Practicum: School Psychology. (1-3).

(May be repeated for a maximum of 9 credits.) Supervised experience in the use of psychological procedures in educational settings. **PREREQUISITE:** Psychology 7402 or equivalent, or consent of instructor.

7615. Special Problems. (1-3).

(May be repeated for a total of 6 credits). Independent investigation of a research problem, or directed readings, in a selected area of psychology chosen in consultation with the instructor. **PREREQUISITES:** Consent of instructor.

†7996. Thesis. (1-3).

Independent research for Master's degree. Application for writing a thesis must be filled out on an approved form after consultation with major professor and filed with the Dean of The Graduate School.

†9000. Dissertation. (1-9).

Independent research for Doctor of Philosophy degree. Application for writing a dissertation must be filled out on an approved form after consultation with the major professor and filed with the Dean of The Graduate School.

† Grades of S, U, or IP will be given.

SECONDARY EDUCATION

PROFESSOR A. FORD HAYNES, JR., *Chairman*

Room 424, The College of Education Building

In the Department of Secondary Education, students may select from several programs as follows:

- A. Master of Arts in Teaching — This program is designed for a selected group of students who have exhibited outstanding academic ability. Programs are available for students who wish to qualify for certification in the secondary school as well as for students who already hold certification.

Requirements are: EDFD 7521, EDFD 7001 (EDFD 7012 or 7021 or 7031 may be elected by individuals who have completed undergraduate or graduate course work in the cultural foundations), EDPS 7121 or 7112, EDUC 7401, an appropriate advanced methods course.

For candidates seeking certification, additional requirements include 12 semester hours in the teaching endorsement area, outside the College of Education, and 9 semester hours in student teaching (SCED 6841 or 7847).

For students who already hold secondary school certification, additional requirements include 15 semester hours in the teaching endorsement area, outside the College of Education, 6 semester hours of electives, selected in consultation with the advisor, at least 3 semester hours of which must be in courses with SCED or EDUC prefixes.

Minimum total: 36 semester hours.

- B. Master of Education — Secondary Education — This program is generally designed for individuals who already hold secondary school certification.

Requirements are: EDFD 7521, EDFD 7001 (EDFD 7012 or 7021 or 7031 may be elected by individuals who have completed undergraduate or graduate course work in the cultural foundations), EDPS 7121 or 7112, EDUC 7401, an appropriate advanced methods course, 9 semester hours in the teaching endorsement area outside the College of Education, 9 semester hours of electives, of which at least 6 semester hours must be taken in courses with SCED or EDUC prefixes, selected in consultation with the advisor.

If a candidate does not hold a professional certificate, he will be required to complete prerequisites and/or corequisite requirements necessary to meet certification standards.

Minimum total: 33 semester hours.

- C. *Master of Education — Secondary Education — This program is designed for individuals who have an interest in working in educational-instructional settings, but who are non-public school oriented. It is not open to certificated teachers, or available to secondary school teachers seeking certification. Admission requirements are the same as those for the regular M.Ed. program, except that no secondary teaching certificate is required.

Prerequisites for admission to the program are six semester hours of course work at the upper division undergraduate or graduate level, which includes one course in the psychological foundations, and one course in either the historical, sociological, or philosophical foundations.

Requirements are: Research (EDFD 7521 or 7511 or 7541), Curriculum (EDUC 7401 or 7451 or 7531), 9 semester hours in related content fields outside the College of Education; 15 semester hours selected in consultation with the departmental advisor, at least 9 semester hours of which must be taken in the Secondary Education Department (Courses with EDUC or SCED prefixes); 3 semester hours of electives. Minimum total: 33 semester hours, excluding prerequisites.

- D. Education Specialist —Curriculum and Instruction, Curriculum and Instruc-

tion (Secondary Education), (English Education), (Music Education), (Science Education), *(Business Education), (Social Studies Education), (Mathematics Education) or *(Higher Education). Requirements: 30 semester hours in the major concentration, 12 semester hours of electives in the College of Education, EDFD 7521, 7541, 3 additional semester hours in Foundations of Education and 15 semester hours in the teaching endorsement area. Additional information pertaining to specific course requirements in the major and collateral areas may be secured from the Department of Secondary Education. Minimum total: 66 semester hours of graduate credit with a minimum of 9 semester hours selected from courses numbered 8000 or above.

- E. Doctor of Education — Curriculum and Instruction, Curriculum and Instruction (Secondary Education), (English Education), (Music Education), Science Education), *(Business Education), (Social Studies Education), (Mathematics Education) or *(Higher Education). Requirements: 45 semester hours in the major concentration, 18 semester hours of electives in the College of Education, EDUC 8950, EDFD 7521, 7541 and 8521 or 8542, 3 additional semester hours in Foundations of Education and 21 semester hours in the teaching endorsement area. Additional information pertaining to specific course requirements in the major and collateral areas may be secured from the Department of Secondary Education. Minimum total: 99 semester hours of graduate credit with a minimum of 21 semester hours selected from courses numbered 8000 or above.

*NCATE does not accredit programs for non-certificated personnel nor programs in higher education.

**For details concerning these programs see the Business Education and Office Management Department.

EDUCATION (EDUC)

7205. Simulation and Gaming. (1-3).

Surveying, analyzing and designing simulation and gaming activities appropriate for classroom situations. Emphasis will be placed on individual and group participatory activities.

7302. Preparation of Inexpensive Instructional Materials. (3).

Design and preparation of a wide variety of readily-available instructional materials. Laboratory practice is provided in applying techniques such as lettering, coloring, and mounting of illustrations and other materials in preparation of both transparent and non-transparent graphics.

7303. Utilization of Audio-Visual Media. (3).

Analysis of communication theory; development of message design in utilization of multi-sensory aids in theoretical and practical environments; projects developed and presented for class analysis; laboratory experience in media equipment; evaluation and selection of media.

7304. Programmed Instruction. (3).

Theories and techniques of programmed learning applied to design, production, and evaluation of programs. Students will prepare and field test programmed materials.

7305. Survey of Communications Media. (3).

Survey of communications theory in relation to motivation, persuasion, perception, and environment in instructional situations. Analysis of communications media as determinants and controls of learning.

7307. Practicum in Instructional Media. (3-6).

Designed to provide supervised experiences in application of theoretical and practical solutions of various types of communication environments, and dealing with problems relative to media utilization in the school. **PREREQUISITE:** Consent of instructor.

7308. Administration and Organization of Educational Media Programs. (3).

Considers problems of organizing, administering and evaluating materials and equipment services. Emphasis on selection and evaluation of personnel, school plant requirements, expenditures, staff development and utilization, sources of materials, uses of equipment, and implementation of media programs within the school. **PREREQUISITE:** Permission of the instructor.

7309. Individualizing Instruction. (3).

Analyzing various paradigms for individualizing instruction. Emphasis will be placed on designing, developing, evaluating, and managing alternative models.

7381. Family Finance Education in Schools. (3).

An overview course designed to provide teachers with knowledge about family financial problems and experiences and ways in which this knowledge can be used to relate to subject areas in the classroom. **PREREQUISITE:** Permission of the instructor.

7391. Teaching in the Community College. (3).

This course is designed to improve the quality of classroom teaching in the community college by broadening and deepening the scope and levels of perceived needs, relationships, contingencies, and relevant competencies. **PREREQUISITE:** Permission of the instructor.

7401. Fundamentals of Curriculum Development. (3).

A study of the fundamental aspects of curriculum development and the basic issues underlying curriculum. Four significant aspects are: educational directions; ordering potential experiences; patterns of curriculum organization; and the determination of principles and procedures by which changes in the curriculum can be made, evaluated and sustained.

7451. Curriculum Development in the Community College. (3).

A course to develop ability to provide a relevant curriculum for the clientele of the community college. Particular attention will be given to the diverse nature of the students and the relationships of the curricular components to each other, as well as to the students. **PREREQUISITE:** Permission of the instructor.

7531. Seminar in Curriculum Improvement. (3).

Analysis of varying positions as presented in significant writings influencing educational thought on curriculum. Emphasis is on procedures utilized for curriculum improvement and study of current curriculum developments in the major disciplines in grades K-12.

7701. Workshop in Family Finance Education. (1-6).

This course is designed to assist teachers in using materials, information and techniques for improving instruction related to financial problems of life. Practical applications of money management in terms of planning, buying, borrowing, saving, investing, protecting and sharing. **PREREQUISITE:** Permission of the instructor.

7702. Workshop in Educational Media. (1-6).

Designed for in-service teachers to improve instruction in pre-school through grade twelve. Content will change as indicated by developments, problems, and individual needs in this area. PREREQUISITES: Teaching experience and consent of workshop instructor.

7801. Supervision of Student Teaching. (3).

This course deals with principles and techniques of supervising student teaching. It is designed for supervising teachers, administrators, coordinators of student teaching programs, and college personnel who supervise student teachers.

7991. Special Problems in Instruction. (1-3).

Individual investigation and report in the area of classroom instruction under the direction of a faculty member.

7992. Special Problems in Curriculum. (1-3).

Individual investigation and report in the area of curriculum development under the direction of a faculty member.

7997. Special Problems in Higher Education. (1-3).

Individual investigation and report in a selected area of higher education under the direction of a faculty member.

†8000. Education Specialist Thesis. (3-6).

Individual study of a research problem, closely related to the student's field of major concentration.

†8001. Education Specialist Field Study. (3-6).

Individual study of a significant problem in a local school system. The study shall be closely related to the student's field of major concentration.

8401. Theory and Practice of Curriculum Development. (3).

An advanced course in curriculum development. Analytical and critical in approach, the course covers theoretical curriculum issues, and fundamental principles of design, patterns of organization, decision making, process, and evaluation in curriculum improvement. PREREQUISITE: Education 7401, or permission of instructor.

8451. Practicum in Community College Teaching. (3-6).

For advanced graduate students who are planning to teach at the college level. Emphasis is placed on problems, methods, and techniques of teaching in junior and community colleges through participation in seminar, with opportunities to observe college teaching as well as to teach classes under close supervision. PREREQUISITE: Permission of the instructor.

8471. Seminar in Research and Development of Educational Media. (3).

Individual and group study of professional and research problems in media. PREREQUISITE: Consent of instructor.

†8950. Dissertation Seminar. (3).

Designed to provide graduate students an opportunity to develop research studies. Based on research and statistic courses previously completed or in progress, the student will have an opportunity to expand his knowledge and use of research techniques. A dissertation prospectus is submitted for analysis before approval by the student's graduate committee. PREREQUISITE: admission to candidacy, EDFD 7521, EDFD 7541, EDFD 8521, or 8542.

†9000. **Doctoral Dissertation. (3-12).**

Credit may be earned over a period of several semesters. The dissertation may be an organized scientific contribution or a comprehensive analysis of theory and practice in a specific area.

SECONDARY EDUCATION (SCED)

6337. **Seminar in Driver and Traffic Safety Education. (3).**

An in-depth study of current problems, research and research methodology in driver and traffic safety education. PREREQUISITE: 3335 or equivalent.

*6701-20. **Workshops in Secondary Education. (1-9).**

A study of selected phases of the secondary school curriculum through group study. This course is designed to assist both inservice and prospective teachers of grades 7-12 in improvement of the teaching-learning processes. Attention is given to common elements of basic methodology, utilization of appropriate materials and resources, and evaluative criteria.

SCED 6701. **Workshop—Improvement in Instruction. (1-3).**SCED 6702. **Workshop—Secondary Curriculum. (1-3).**SCED 6703. **Workshop—Social Studies Education. (1-3).**SCED 6704. **Workshop—Language Arts Education. (1-3).**SCED 6705. **Workshop—Science Education. (1-3).**SCED 6706. **Workshop—Math Education. (1-3).**SCED 6707. **Workshop—Family Finance Education. (1-3).**SCED 6708. **Workshop—Newspaper in the Classroom. (1-3).**

*Not more than 9 semester hours of workshop credit can be applied toward a degree

†6841. **Supervised Practicum in the Secondary School. (3-9).**

(formerly Director Student Teaching in the Secondary School)

Observation of the growth and development of pupils and of methods of teaching; participation in school activities, culminating in assuming responsibility for teaching entire groups.

†6842. **Supervised Practicum in the Secondary School. (3-6).**

(formerly Director Student Teaching in the Secondary School)

For the student who has completed six semester hours or less of student teaching on the secondary level and desires some additional experience.

7301. **Modern Methods in Secondary Education. (3).**

A consideration of the overall task or function of secondary education and what this means to secondary school teaching. How the secondary school can perform its role most effectively.

7341. **Seminar in the Teaching of High School English. (3).**

Includes both curriculum and instruction of high school English; selection of materials and the derivation of procedures for guiding learning in language, composition, and literature. Concentration by individual students upon special problems.

7342. **Teaching Language and Composition in the Secondary School. (3).**

For teachers of secondary school English, concentration of problems, curricular materials, and teaching procedures in the areas of grammar, and written composition, with emphasis on application of linguistic knowledge.

7343. Teaching Literature in the Secondary Schools. (3). (6341)

Curricular materials, methods of organization, and approaches to the study of secondary school literature, with attention to the problems of teaching prose fiction and nonfiction, drama and poetry.

7351. Teaching of Mathematics in the Secondary School. (3).

Consideration of principles and techniques of teaching, as well as materials of instruction in the area of mathematics. Current mathematics curriculum materials, in both experimental and commercial, will be studied and evaluated. PREREQUISITE: Permission of instructor.

7361. Modern Methods and Techniques for Biological and Physical Sciences. (3).

An examination and analysis of modern high school biological and physical science programs. Orientation is directed toward familiarizing the high school teacher with current strategies for teaching the sciences, emphasizing extensive use of the laboratory as a source of information from which high school students can draw logical conclusions.

7362. Science Content and Materials for the Junior and Senior High School. (3).

A critical examination and analysis of the research in science education (teaching) and its implications for science content and materials. Emphasis will be placed on current concepts of the science curriculum and the selection of appropriate materials in teaching the various sciences.

7371. The Teaching of the Social Studies in the Secondary School. (3).

A study will be made of the needs of secondary-school youth as they relate to the Social Studies and of instructional strategies appropriate thereto.

7431. The Middle School. (3).

This course will investigate the emerging concepts of the middle school. It will study the students involved, methods utilized in the instructional process, preparation of administrators, faculty, and staff, innovations applicable to the middle school, trends in classroom organizations and procedures, and the curriculum.

7461. The Pupil Activity Program. (3).

A study of current philosophy and practice in regard to responsibilities of teachers, supervisors, and administrators for those phases of educational practice which are essential for the educational program, but are not considered as part of general classroom procedure.

†7847. Intern Teaching in the Secondary School. (3-6).

A professional experience in supervised teaching designed for candidates for the degree of Master of Arts in Teaching who are seeking secondary school certification. Intern teaching consists of full-time teaching for two semesters providing nine semester hours of credit with not more than six semester hours during any one semester. PREREQUISITES: Education 7001, 7401, 7521, and Education 7121, an appropriate methods course, approval of the student's adviser, approval of the Coordinator of Student Teaching, and acceptance as an intern by a cooperating school system.

†7848. Intern Teaching in the Secondary School. (3-6).

This is the second semester of intern teaching for the student who has successfully completed Education 7847. PREREQUISITE: Education 7847.

7911. Development of the Secondary Science Curriculum. (3).

A laboratory study of the historical development of the junior and senior high school science curricula. Emphasis is placed on major social factors and scientific theories that have influenced the changes in secondary school science curricula. PREREQUISITE: Permission of the instructor.

†7996. Thesis. (3-6).

Only students with superior scholarship are permitted to register in this course. The student must present in writing an outline describing the proposed thesis. This outline when approved by the faculty members under whose direction the thesis is to be written, must be submitted to the Chairman of the Department of Secondary Education for his approval. This course will involve writing the thesis and will emphasize the adequate set-up of the problem, the collection of the data, their use, and conclusions to be reached.

Application for writing a thesis must be filled out on an approved form after consultation with the major professor and filed with the Dean of The Graduate School at the time of registration.

8301. Seminar in the Improvement of Instruction in the Secondary School. (3).

Factors bearing upon the improvement of instruction in the secondary school; the evaluation of research and the individual study of fundamental problems in the improvement of instruction in the secondary school. **PRE-REQUISITE:** Education 7401.

8441. Seminar in Secondary Curriculum Development. (3).

A study of fundamental problems and evaluation of current research in secondary curriculum development. Emphasis on identification and critical appraisal of current curriculum developments and trends in American secondary schools.

† Grades of S, U, or IP will be given.

*Not more than 9 semester hours of workshop credit can be applied toward a degree.

SOCIOLOGY

PROFESSOR JERRY MICHEL, *Chairman*

Room 223, Clement Hall

Graduate students who select sociology as a major area will consult with the Coordinator of Graduate Studies in the Department as to their program of study. Applicants for admission to the program must meet the admission standards of the Graduate school and have at least fifteen (15) hours of undergraduate work in sociology. Once admitted to the program, students may choose one of two alternative degree programs available within the Department: (A) the thesis program which requires thirty (30) semester hours of graduate level work, with 3-6 hours of Sociology 7996 (thesis); (B) the non-thesis program which requires thirty-three (33) semester hours of graduate work and successfully passing both written and oral comprehensive examinations. The following courses are required of *all* majors: Sociology 7110, 7210, 7320, and 6312. At least twenty-four (24) semester hours of the student's course work must be within the Department of Sociology. It is the responsibility of each student to obtain copies of "Degree Requirements for Master of Arts in Sociology" and the Department's "Recommended Reading List" from the Graduate Coordinator or the Departmental office. These documents will answer most of the student's questions concerning the program and give direction for the personal study expected of all students.

SOCIOLOGY

6211. Modern Sociological Theories. (3).

European contributions, American developments, recent trends and influences in sociological theory.

6222. History of Social Thought. (3).

Emphasis on the historic sources of social ideas in Western culture in terms of their relevance to contemporary systematic theory.

6312. Intermediate Social Statistics. (3).

Inductive statistical methods for analysis of *sociological data*. *Probability*, sampling, parametric and nonparametric tests of significance of correlation techniques, research design, and analysis of variance and covariance. **PREREQUISITE:** Sociology 3311 or its equivalent, or permission of the instructor.

6411. Urban Anthropology. (3).

Anthropological studies of pre-industrial and industrial cities. Urbanization, movements of social transformation and other processes of adjustment to an urban milieu. Urban slums, ethnic ghettos, and housing developments in cross-cultural perspective. Urban kinship organization. Urban community development. Urban research techniques. **PREREQUISITE:** Anthropology 1200 or Sociology 1111, or permission of the instructor.

6522. Analysis of Juvenile Delinquency. (3).

Trends of juvenile delinquency; the development of case study techniques and diagnosis of juvenile delinquency; comparative analysis of various theoretical approaches.

6610. Population. (3).

Population theories and policies; their definition and history. Trends in population growth; methods of population analysis, and trends in fertility and mortality. Emphasis on fertility, mortality, sex and age composition, and migration and their influences on population change.

6620. Human Ecology. (3).

Spatial structure and land use patterns of urban, rural, and fringe areas; city growth, its spatial and communicative extension into suburban and rural areas, and its impact on the economy, values and social organization of communities.

6720. Collective Behavior. (3).

Emergence of collective behavior, spontaneous collectivities, social movements, social consequences of restrictive collective behavior.

6830. Directed Individual Study. (1-3).

Individually directed advanced reading and/or research in special areas of interest. PREREQUISITE: permission from departmental chairman.

6842. Sociology of Occupations and Professions. (3).

Sociological analysis of the division of labor, occupational groupings, career patterns, and professional associations in modern American society.

6851. Medical Sociology. (3).

The contributions of sociology to medicine; the sociology of illness, particularly mental illness; practitioners, patients and medical settings, particularly the modern hospital; the organization and the sociology of the distribution of medical care; the status and the methods of research in medical sociology.

7010. Seminar in the Sociology of Deviant Behavior. (3).

A seminar in the sociological approaches to the study of deviance and social disorganization with an emphasis on current sociological theory and research. PREREQUISITE: Graduate standing, Sociology 7110 (Pro-seminar) or equivalent and consent of instructor.

7110. Proseminar. (3).

Review and integration of major propositions, concepts, and methods from the various fields of sociology in their current state.

7111. Seminar in General Sociology. (3).

A seminar designed to provide students who are non-majors with an overview of the discipline. Acquaints the students with the sociological viewpoint in the analysis of social issues. (Will not apply toward a M.A. in Sociology.)

7210. Theory Seminar. (3).

An advanced analysis of recent developments in sociological theory, including the relationship of theory to empirical research.

7230. Systems Theory Seminar. (3).

The advanced analysis of specialized sociological systems as developed by American and European sociologists.

7320. Seminar in Methods of Social Research. (3).

A seminar dealing with: (1) advanced statistical methods, including experimental design, the analysis of stochastic processes, and similar procedures; and (2) the general methodology of social research, including such topics as the location of research problems, the structure of arguments, the nature of evidence, and the more general logic of social research.

7330. Seminar in Current Research Literature. (3).

A seminar dealing with current topics of interest in the field. Topics will vary in response to the interests of the students and specialists of the staff. (May be taken twice for three hours credit each time.)

7412. Urban Problems and Research. (3).

This course will study some selected urban problems and the development of sound research techniques for their solution. Actual field research in the Memphis Metropolitan Area will be conducted.

7413. Urban Theory Seminar. (3).

A seminar in sociological theories of urbanism and urbanization. Analysis of both historical and contemporary theories. PREREQUISITE: Graduate standing, and consent of instructor.

7420. Seminar in the Family. (3).

An advanced course in the study of the family which is primarily concerned with research findings in the areas of family disorganization, changes in family structure and function, parent-child interaction, working mothers, and problems of aging.

7440. Social Stratification. (3).

This course will examine the theories of Marx, Weber, Warner, Parsons, and Bendix among others. Furthermore, this course will encompass the study of the relationship between class, prestige, life-style and ideology in cross cultural perspective. Finally, it will also examine the factors relating to the increase and decrease in rates of social mobility.

7460. Formal Organizations. (3).

The relationship between organizational structure, ideology, and interaction patterns.

7610. Techniques of Population Analysis. (3).

An analysis of the sources of population data and the techniques for utilizing these data in population research and in other forms of social research in which population data are a meaningful part.

7712. Social Structure and Personality. (3).

Research and theory relating social structural variables to processes of socialization, personality development, and conceptions of role and self. PREREQUISITE: Sociology 4710 (or equivalent) or permission of instructor.

7713. Seminar in Role Theory. (3).

Investigation and analysis of the fundamental problems in conceptual and empirical definition of roles. Emphasis will be placed on the development of roles and role correlates and the processes of role maintenance and change. PREREQUISITE: Sociology 4710 (or equivalent) or permission of instructor.

7810. Racial and Cultural Minorities. (3).

A study of the empirical and conceptual aspects of minority status as determined by racial and cultural criteria.

7880. Sociology of Knowledge. (3).

Systems of thought, including metaphysical theories and social and political philosophies are studied from the standpoint of their causal interdependence with social structures and processes. PREREQUISITE: Graduate standing, and consent of instructor.

†7996. Thesis. (3-6).

Supervised research in preparation for advanced degree thesis. **PRE-REQUISITE:** The formal filing of a research proposal and outline of procedures acceptable to the student's graduate committee.

SPECIAL EDUCATION AND REHABILITATION

PROFESSOR WILSON L. DIETRICH, *Chairman*

Room 101A, Special Education Building

The Department of Special Education and Rehabilitation offers the degree Master of Education with concentrations in various areas as listed. The degree Education Specialist and Doctor of Education may be considered only after conference with the Departmental Chairman or his representative. For completion of the master's degree program, a student must satisfactorily complete an oral and written comprehensive examination or an oral examination and thesis.

Students are encouraged to study in two or more areas of Special Education and Rehabilitation within the degree requirements. A typical program must consist of a minimum of 33 semester hours of graduate credit.

A. All students must complete the following prior to the granting of the degree:

1. College of Education Requirement
EDFD 7521—Introduction to Research 3 semester hours
2. Collateral Area Electives
To be determined with student advisor
(Outside College of Education) 9 semester hours
3. SPER 7000—Psycho-Educational Problems of
Exceptional Children and Adults* 3 semester hours
4. Certificate Requirements (State of Tennessee)
(Mental Retardation only.)
Language Development** 3 semester hours
Teaching of Reading* 3 semester hours
5. Concentrations Available 15-21 semester hours
Mental Retardation
Learning Disabilities
Emotionally Disturbed
Multihandicapped
Vocational Rehabilitation

B. Master of Education — Special Education and Rehabilitation *** (for Non-Certificated Personnel)

A non-certificated program is available for vocational rehabilitation personnel and other related fields to Special Education and Rehabilitation such as occupational therapy and physical therapy. Students must complete a minimum of six semester hours in upper division or graduate courses in psychological, sociological, philosophical or historical foundations prior to being admitted to candidacy for the degree.

1. College of Education Requirements
EDFD 7511—Measurement and Evaluation 3 semester hours
2. Collateral Area Electives
To be determined with faculty advisor
(Outside College of Education) 9 semester hours
3. SPER 7000—Psycho-Educational Problems of
Exceptional Children and Youth* 3 semester hours
4. Concentrations Available 15-21 semester hours
Mental Retardation
Learning Disabilities
Emotionally Disturbed
Multihandicapped
Vocational Rehabilitation

*Not required if equivalent course taken at undergraduate level or in other approved graduate school or in non-certificated programs.

**May be within collateral area.

SPECIAL EDUCATION AND REHABILITATION (SPER)

*** 7000. Psycho-Educational Problems of Exceptional Children and Adults. (3). (formerly 6151).**

A course for educators, students in behavioral sciences, and students beginning graduate study in special education and rehabilitation. Study of the relevant research dealing with the physical, mental, emotional, and social traits of all types of exceptional children and adults. Consideration of major current problems and practices in the development of various programs.

7001. Tests and Measurements for Exceptional Children and Adults. (3). (formerly 7152).

The primary emphasis is the development of an understanding of and/or ability to interpret the results of psychological and education tests. Practice is provided in test administration, with emphasis on diagnosis and problems encountered in children and adults who are auditorily, orthopedically, visually, mentally, emotionally, and speech handicapped. PREREQUISITE: SPER 7000.

7002. Independent Study in Special Education. (3-6). (formerly 7994).

A course designed to offer opportunity and challenge of self-directive, independent study to students in special education, i.e., to develop the individual's ability as an independent student to enable the student to pursue needed study in a field in which appropriate courses are not being offered. PREREQUISITE: Consent of instructor.

7003. Workshop in Special Education. (3-6).

A course designed for teachers and others who work with exceptional children and adults, allowing them the opportunity of intensively studying current methodologies, research, etc., in the various areas of exceptionality. (e.g. special summer institutes, etc.).

7201. Psycho-Social and Educational Aspects of Emotional Disturbance. (3)

This course develops a frame of reference for the needs, problems and treatment of the emotionally disturbed. Major areas of concentration include: gaining specific psycho-social and behavioral knowledge and an analysis of various educational strategies and programming procedures for the emotionally disturbed. PREREQUISITE: Consent of instructor.

7211. Methods and Techniques of Teaching Children with Emotional Problems. (3).

Focus is upon the teacher in the educational process; including assessment and remediation of learning and adjustment problems; selection and use of methods and materials; the helping relationship, and classroom management. PREREQUISITE: Consent of instructor.

7221. Intervention Approaches for Educating Children with Emotional Problems. (3).

Exploration of specific treatment concepts and educational strategies in current use; planning and utilization of community, professional, and school resources; and the teacher's role in a multi-discipline team approach. PREREQUISITE: Consent of instructor.

7241. Supervised Practicum with Pupils Who Have Emotional Problems I. (3-6).

Responsibility for individual tutoring and group instruction in public and/or residential programs for younger children with emotional problems. Observations, staff conferences and communication, evaluation and/or seminar discussions, and appropriate teaching preparations are included. PREREQUISITE: Consent of instructor.

- 7242. Supervised Practicum with Pupils Who Have Emotional Problems II. (3-6).**
Responsibility for individual tutoring and group instruction in public and/or residential programs for older children with emotional problems. Observations, staff conferences and communication, evaluation and/or seminar discussions, and appropriate teaching preparations are included. **PREREQUISITES:** SPER 7241.
- 7301. Psycho-Social and Educational Aspects of Deafness. (3).**
Historical and current societal perceptions of the deaf; an analysis of the various patterns and effects of auditory impairment on children and adults; intelligence, personal and social adjustment, the psychological processes and how they affect the acquisition of language, speech and speech reading.
- 7401. Psycho-Social and Educational Aspects of Learning Disabilities. (3). (formerly 6176).**
This course deals with the psychological, social and educational characteristics of individuals with learning disabilities. Theories and philosophies regarding the treatment of learning disabilities will be reviewed. Specific aspects of characteristics to be covered will include etiology, diagnosis, and management considerations. **PREREQUISITE:** Consent of instructor.
- 7411. Methods of Teaching Children with Learning Disabilities I. (3).**
A course dealing with the basic remedial approaches with young children with learning disabilities. The relationship between developmental sequence and educational practices will be stressed. **PREREQUISITES:** SPER 7401 and consent of instructor.
- 7412. Methods of Teaching Children with Learning Disabilities II. (3).**
A course dealing with methods of teaching older students with learning disabilities. The relationship between academic subject matter and remedial learning deficits will be stressed. **PREREQUISITE:** SPER 7411.
- 7431. Advanced Theories in the Classroom Management of Children with Learning Disabilities. (3). (formerly 8431).**
This course will require that the students become thoroughly acquainted with the leading theories in the field of the education of children with learning disabilities. Emphasis will be placed on relating these to classroom methods, management of behavior problems, and the remediation of perceptual-motor problems. **PREREQUISITE:** Consent of instructor.
- 7441. Practicum in Teaching Children with Learning Disabilities I. (3).**
A course designed to provide graduate students with supervised experiences in working with younger children with learning disabilities in various educational settings. **PREREQUISITES:** SPER 7401 and consent of instructor.
- 7442. Practicum in Teaching Children with Learning Disabilities II. (3-6).**
A course designed to provide graduate students with supervised experience in working with older children with learning disabilities in various educational settings. **PREREQUISITES:** SPER 7441 and consent of instructor.
- 7501. Psycho-Social and Educational Aspects of Mental Retardation. (3).**
A study of etiology, types, and nature of mental retardation. Research of the psycho-social and educational aspects of retardation is examined. Historical and current societal perceptions and definitions of the mentally handicapped; their social, emotional, physical, and learning characteristics and how they affect the learning process.

7511. Clinical Problems in Teaching Mentally Retarded Children. (3).

Emphasis is placed on diagnostic and pedagogical techniques used with retarded children at the pre-academic level. Formal reporting is also emphasized. PREREQUISITE: SPER 7000 and SPER 7501.

7512. Curriculum and Instruction for the Educable Mentally Retarded. (3).

A study of organization patterns, curriculum designs, instructional techniques, and materials for the educable mentally retarded. Development and application of teaching strategies to meet the needs of the educable mentally retarded will be stressed. PREREQUISITES: SPER 7501.

**7513. Techniques of Teaching the Educable Mentally Retarded at the Secondary Level. (3).
(formerly 6165).**

Emphasizes the needs of the adolescent and young adult mental retardate. The work-study program, functional academics, and academic remediation is stressed. PREREQUISITE: SPER 7512.

7516. Instructional Programs and Provisions for the Trainable Mentally Retarded. (3).

A study of residential, public and private day school, and agency provisions for the trainable mentally retarded. Instructional objectives, techniques, and programs will be stressed. Behavior and progress evaluation and home-school-community relations will also be considered. PREREQUISITES: SPER 7501.

**7521. Advanced Theory in Curriculum Development for the Mentally Retarded. (3).
(formerly 7161).**

A course to teach the theoretical and philosophical foundations for the experience-centered curriculum for the mentally retarded. Research will be studied and evaluated. Issues will be debated and proposals for curricular approaches will be presented and defended.

**7541. Supervised Practicum With the Educable Mentally Retarded I. (3-6).
(formerly 6881).**

Observation of demonstration teaching and participation in teaching. Experience in work-study programs is stressed.

**7542. Supervised Practicum With the Educable Mentally Retarded II. (3-6)
(formerly 6881).**

Observation of demonstration teaching and participation in teaching. Experience in work-study programs is stressed.

**7546. Supervised Practicum with Trainable Mentally Retarded. (3-6).
(formerly 6883).**

Orientation, observation, and teaching with trainable mentally retarded pupils.

**7601. Educational and Medical Aspects of Crippling and Special Health Problems. (3).
(formerly 6172).**

This course consists of a detailed study of the various types of physically disabling conditions which cause either temporary or permanent decreases in educational proficiency. Special methods of instruction for these health conditions would be studied along with suitable adaptations of materials for such afflicted children within the framework of the public school organization.

**7602. Education and Rehabilitation of the Cerebral Palsied. (3).
(formerly 6162).**

The content of this course deals entirely with the cerebral palsied, Etiology, diagnosis, characteristics, educational planning, vocational training, and placement are covered.

**7611. Psycho-Educational Considerations of the Homebound and Hospitalized Children. (3).
(formerly 6171).**

The role of the homebound and hospital teacher is explored in the light of her duties and competencies. Emphasis will be placed on the somatopsychological aspects of motivation as they relate to providing a learning environment for the homebound or hospitalized child.

**7641. Supervised Practicum with Pupils Who Have Crippling and Special Health Conditions. (3-6).
(formerly Student Teaching with Pupils who have Crippling and Special Health Conditions and 6882)**

Orientation, observation, teaching with pupils who have crippling and special health conditions.

**7711. Methods and Materials for Teaching Visually-Handicapped Children. (3).
(formerly 6181).**

A course primarily designed for teachers of the partially-seeing and blind within the framework of public schools, consisting of study in the growth and development of visual imbalance, and the environment and educational implications of visual problems; the historical background of special programs in the education of the visually handicapped, and the adaptation of educational methods and materials to the teaching of such handicapped children.

**7731. Teaching of Braille I. (3).
(formerly 6182).**

A course designed to give the basic fundamentals in Braille instruction, including the introduction of equipment for Braille writing, development of skill in the use of such equipment, the history and development of Braille and other instructional procedures for the blind.

7732. Teaching of Braille II. (3).

A continuation of SPER 7731, this course is designed to provide the student with a comprehensive knowledge of the actual reproduction and development of braille. PREREQUISITE: SPER 7731.

**7801. The Talented and Mentally Gifted. (3).
(formerly 6131).**

Historical and current societal perceptions and definitions of the talented and mentally gifted individuals; their social, emotional, and learning characteristics and how they affect the learning processes.

7901. Principles and Techniques of Rehabilitation Counseling. (3).

This course is designed to provide an overview of the broad field of rehabilitation. Topics include philosophical, social, psychological, and legal basis of rehabilitation, the rehabilitation process, and the counselor's role and function in the rehabilitation process.

7903. Psycho-Social Aspects of Rehabilitation. (3).

An advanced graduate course to study the theories and research in the area of the social psychological adjustment of disability. The theories and research of Lewin, Wright, and Barker will be considered.

7911. Medical Aspects of Rehabilitation. (3).

Orientation of the medical profession, its specialties and relationship to rehabilitation; a familiarity with basic medical and clinical terminology, a survey of body systems, their basic functions, malfunctions; and the more common diagnostic and treatment procedures.

7921. Vocational Development and Occupational Information Service. (3).

Collection, evaluation and use of occupational, educational and related information in rehabilitation. Familiarity with the development of job descriptions and vocational surveys. The study of labor market trends and theories of occupational choice.

7941. Practicum in Rehabilitation Counseling. (3).

To provide student with supervised counseling experiences with rehabilitation clients. The course content will permit the application of appropriate theories, principles and practices to personal counseling. Sessions will be taped, recorded, and critiqued by a member of the rehabilitation counseling staff.

7942. Internship in Rehabilitation Counseling. (6).

To provide work-study students an opportunity to further their professional competency through supervised field experiences. The course is offered in cooperation with the state agency and under the joint supervision of the rehabilitation agency personnel.

†7996. Thesis. (3-6).**8001. Seminar in Special Education Research. (3).
(formerly 8152).**

A course designed for people who serve as resource personnel in Special Education. Studies and research pertaining to the education of exceptional children are critically examined and conclusions as to use and value are made in the view of the major problem areas in the field. The procedures for conducting and reporting research are also studied and compared. PREREQUISITE: Consent of instructor.

8002. Social-Psychological Aspects of Disabling Conditions. (3).

An advanced graduate course which will deal with the state of knowledge concerning the social position of and attitudes toward the disabled. Considerable attention will be given to the somatopsychological influences on the social adjustment of the disabled and the effect of handicapping conditions upon the family and the society. PREREQUISITE: Consent of instructor.

8100. Administration and Supervision of Special Education Programs. (3).

This course deals with the major areas of school administration and supervision as they relate to special education. It is designed to prepare special educators to work with placement, in-service training, and supervision of professional personnel, organization of programs, financing and budgeting, physical plant facilities and working with related agencies. PREREQUISITE: Consent of instructor.

8231. Advanced Seminar in the Psycho-Social and Educational Aspects of Emotional Disturbance. (3).

Analysis of the theoretical and research bases for present practices in the education and treatment of emotional disturbance. Emphasis on dynamic, behavioral, and organic points of view and environmental factors within a psycho-social and educational framework. PREREQUISITE: Consent of instructor

**8531. Socio-Cultural and Biological Aspects of Mental Retardation. (3).
(formerly 8161).**

A course dealing, in depth, with the current thinking concerning the etiology of mental retardation. Emphasis will be placed upon prevention, treatment and education as important components which our society must recognize when dealing with mental retardation.

**8532. Advanced Seminar in the Theories and Research of
Mental Retardation. (3).
(formerly 8162).**

A critical examination of theories and research regarding cognitive development as it relates to mental retardation. Emphasis will be placed upon the implications of the body of knowledge in the habilitation of the mentally retarded. PREREQUISITE: Consent of instructor.

*Not required if equivalent courses taken at the undergraduate levels. (Substitutions must be made by the adviser).

† **Grades of S, U, or IP will be given.**

SPEECH AND DRAMA

PROFESSOR JOHN H. SLOAN, *Chairman*

Room 143, Speech and Drama Building

The graduate major in Speech and Drama may concentrate in Radio-Television-Film, Rhetoric and Communication Arts, or Theatre and Oral Interpretation, depending on his undergraduate background and experience. Students who choose to major in Speech and Drama will consult their major adviser as to the program of study. The student may request a non-thesis degree program through his adviser to the departmental graduate committee.

The program for the Master of Fine Arts in theatre is a two-year (46 hour) program. Qualified candidates may select one of two areas of concentration, either performance or production. All students in this program are required to take the following core courses:

Speech 7100	Bibliography	3
Speech 7551	Aesthetics	3
Speech 6551	Theatre History	3
Speech 6581	Dramatic Criticism	3
Speech 7584	Techniques in Instruction in Theatre	3
		15

Unconditional admission to the M.F.A. program is based on the following criteria:

1. An overall undergraduate grade point average of 2.75 from an accredited undergraduate institution.
2. A grade point average of at least 3.0 in the last 60 hours of undergraduate work.
3. A grade point average of at least 3.5 in the undergraduate major.
4. Acceptable scores on the Graduate Record Examination or the Miller Analogy Test.
5. Satisfactory completion of a qualifying audition.

Admission to Candidacy

The student may apply for admission to the M.F.A. degree candidacy upon the successful completion of fifteen graduate hours in the core curriculum. To be approved for admission to candidacy the student shall have:

1. A grade point average of at least 3.0 on a 4.0 system.
2. Removed all prerequisite departmental requirements.
3. Demonstrated a requisite level of competence through a qualifying examination.
4. A planned program which meets all departmental and graduate school requirements.

6101. Contemporary Theories of Language. (3).

An examination of the influence of language upon behavior, of the limitations of language as a communicative system, and of the relationships between language and thought.

6341. Interpersonal and Small Group Communication. (3).

Advanced theory in the logical, psychological, and sociological investigation of issues in small groups. **PREREQUISITE:** Speech 3341 and permission of instructor.

6361. History and Criticism of British Public Address. (3).

A study and analysis of British speakers and speaking from the 16th century to the present time. Emphasis will be placed on the speech situation, audience, issues and speakers. Such men as Fox, Pitt, Sheridan, Burke, Disraeli, and Churchill will be considered.

6362. Twentieth-Century American Public Address. (3).

An analysis of the rhetorical communication of twentieth-century America. The course examines the use of new persuasive methods to influence public opinion by leading rhetorical figures and movements. Repeatable to a maximum of six credit hours.

6363. Anglo-American Public Address. (3).

A history and criticism of public argument in the British Empire, 1660-1784. Special emphasis on the emergence of Whig liberalism, the American Revolution and the politics of Empire.

6371. Rhetorical Criticism. (3).

Study of the history and philosophy of the criticism and analysis of practical persuasive discourse. Exposure to and practice in the methods of speech criticism.

6372. History of Speech Education. (3).

An examination of speech educators, their theories, practices and place in history of speech education from classical to modern times.

6421. Interpretation of Poetry. (3).

Studies in the style and structure of poetry of specific types and periods, as related to the response and performance of the oral interpreter. **PREREQUISITE:** Speech 2411.

6431. Interpretation of Prose. (3).

Studies in the oral interpretation of prose fiction, with attention to various literary styles and structures. **PREREQUISITE:** Speech 2411.

6451. Interpretation of Shakespeare. (3).

Studies in the oral presentation of scenes from selected comedies, histories, and tragedies, with exploration of character and dramatic structure.

6511. Stage Lighting I. (3).

Study of elementary electricity and basic stage lighting techniques.

6512. Stage Lighting I. (3).

A continuation of Speech 6511. Advanced theatre lighting design and execution. **PREREQUISITE:** Speech 6511 or permission of instructor.

6531. Acting III. (3).

Acting problems with continued work in acting styles. Term length assignments of scenes designed to develop ensemble acting skills.

6532. Acting III. (3).

A continuation of Speech 6531.

6551. Studies in Theatre History. (3).

Special problems in theatre history: the men and ideas which have shaped the theatre of the western world from antiquity to the present.

6561. Stage Costuming I. (3).

Study of basic costuming techniques.

6562. Stage Costuming I. (3).

A continuation of Speech 6561. Survey of historic dress and the planning and rendering of costume designs. PREREQUISITES: Speech 6561 or permission of instructor.

6563. Theatrical Design II. (3).

A lecture-laboratory course covering the techniques of painting flat scenery for the stage.

6564. Theatrical Design II. (3).

Total production design—the discipline of costume, scenery, and lighting design to an overall production style.

6571. Playwriting. (3).

A study of the theory and principles of writing plays for the stage. Practice in writing either the short or long play.

6581. Dramatic Theory and Criticism. (3).

The major documents in dramatic theory and criticism from Aristotle to the present.

6801. Directed Studies in Radio-Television-Film. (3).

Projects of production or research in areas of special interest. Repeatable to six credit hours.

6810. Broadcast Regulation and Program Policy. (3).

The role of these agencies controlling broadcasting and the development of regulation and policies concerning operations and programming.

6811. Radio and Television Programming. (3).

The analysis and planning of radio and television station programming structures and schedules. The role of programming in broadcasting, factors that affect programming, general concepts of station programming.

6831. Radio and Television Sales and Advertising. (3).

The relation of radio and television advertising to the station, network and station representative; the role of sponsors, agencies and other allied groups.

6871. Radio and Television Station Management. (3).

Theories of management; study and analysis of the special problems and situations confronting the manager of the broadcasting station in personnel, operations, government regulations, programming and sales.

6891. Techniques of Film. (3).

Study and evaluation of past and present approaches in the techniques of editing, camera angles, composition, and continuity. Students will also create and produce short films.

6892. Film Production. (3).

Workshop for making films. PREREQUISITE: Speech 6891.

6921. Play Production for Secondary Schools. (3).

A survey of the problems of the play director in high school. The course considers: choosing the play, casting, directing, technical aspects of production; then relates these items to the student, the school, and the community.

7100. Bibliography and Methods of Research. (3).

The examination of bibliographical aids for the study of theatre. A survey of the types of research in theatre, and the presentation and documentation of scholarly writing in theatre.

7331. Seminar in Human Communication Theory and Research. (3).

Study of current multidisciplinary communication theories, models, systems, dynamics, barriers, breakdowns. Methodological approaches to studying communication behavior. Topics vary each semester. Repeatable up to nine credit hours.

7360. Seminar in Rhetorical Theory. (3).

Intensive studies of the development of rhetorical theory from c. 500 B. C. to the present. Topics will vary each semester. Repeatable to a maximum of nine credit hours.

7362. Seminar in Public Address. (3).

An intensive study of selected topics in the analysis and criticism of public arguments. Emphasis on cross-cultural comparison of arguments and appeal in common rhetorical situations. Repeatable to a maximum of six credit hours.

7364. Systems of Argument. (3).

Intensive study of argument as a means of inquiry and persuasion in rhetorical and dialectical discourse. Explorations of relationships between theories of argumentation and forms of speech such as political and legal oratory, discussion, and debate. Readings will be selected from Aristotle, Cicero, Kant, Whately, Burke, Schopenhauer, Toulmin, Ayre, *et al.*

7365. The Rhetoric of Literature. (3).

Examination of rhetorical elements in creative discourse, and the approach to such discourse through the techniques of rhetorical criticism. Special attention to dramatic literature.

7367. Seminar in Rhetoric and Poetic. (3).

Examination of the relationships between predominantly persuasive and fictive modes of discourse.

7368. Macrorhetoric. (3).

A study of the relationships between public deliberation, propaganda, and social change. Emphasis on movement theory, the formation and function of ideologies, strategies and tactics of agitation, and the process of public value formation.

7421. Seminar in Individual Authors. (3).

Depth interpretation of the work of a selected author.

7431. Directing Interpreters Theatre. (3).

Studies in script preparation; directing techniques for group interpretation of prose, poetry, and drama.

7451. Seminar in Prosody and Criticism. (3).

Studies in versification and in the major critical approaches to literature from the oral reader's point of view.

7461. Studies in Oral Interpretation.

Advanced work in special problems related to the interpretation of poetry and prose styles.

7471. Theories of Interpretation. (3).

Studies in critical, historical, and aesthetic approaches to oral interpretation.

7481. Research in Oral Interpretation. (3).

Conference course in advanced study of oral interpretation.

7521. Stage Direction. (3).

A study of the principles governing the production of a play from the analysis of the manuscript through its presentation upon the stage. Students will direct scenes or one-act plays as part of their class work. (May be repeated for a maximum of 6 credits.)

7551. Seminar in Theatre Aesthetics. (3).

A survey of aesthetic theories affecting the theatre from Classical Greece to the present. Special attention will be given to the study of the interrelationship of theatre and the other arts. (May be repeated for a maximum of 9 credits.)

7552. Seminar in American Theatre. (3).

A study of the plays, players and playwrights of the American Theatre from its beginnings to 1920.

7553. Studies in American Theatre. (3).

Specialized study of the American Theatre from several points of view, such as the development of the physical playhouse, the stage director, and of dramatic criticism.

7554. Seminar in Directing. (3).

Specialized study of advanced theories and techniques of directing for the theatre with emphasis on the demands of contemporary theatre architecture. (May be repeated for a maximum of 9 credits.)

7555. Seminar in Stage Design. (3).

Specialized study of advanced theories and techniques of theatre design with particular emphasis on the demands of contemporary theatre architecture. (May be repeated for a maximum of 9 credits.)

7556. Theatre Planning and Management. (3).

A study of the principles of theatre planning and management for educational and regional theatres. (May be repeated for a maximum of 9 credits.)

7558. Seminar in Modern World Drama. (3).

Conference course in advanced study of world drama from approximately 1900 to the present with emphasis on recent trends in playwriting and production. (May be repeated for a maximum of 6 credits.)

7571. Advanced Playwriting. (3).

A continuation of the theories and practice of playwriting with the object of achieving a finished script, ready for production. PREREQUISITES: Speech 6571. (May be repeated for a maximum of 9 credits.)

7581. Seminar in Dramatic Types. (3).

A study of the four main types of drama—tragedy, comedy, farce, and melodrama—from classical to modern times. (May be repeated for a maximum of 6 credits.)

7582. Research in European Drama. (3).

Conference course in advanced study of the drama of Europe from the Middle Ages to 1900. (May be repeated for a maximum of 6 credits.)

7583. Research in Theatre. (3).

Research in specialized areas of drama and theatre, such as dramatization of American and/or English literature; history of English and American drama criticism; Renaissance treatises on theatre art and architecture; history of costume, *et cetera*. (May be repeated for a maximum of 6 credits.)

7584. Techniques of Instruction in Theatre. (3).

Supervised experience in the approach to teaching basic theatre courses, both aesthetic and production subjects, with the development of the specialized skills required for instruction in the performing arts.

7804. Seminar: Mass Communication Content. (3).

A study of particular forms and types of content. This course may be taken three times (9 credits total). Topics will vary each time offered.

7805. Seminar: Literature of Mass Communication. (3).

Survey of the literature of mass communications. This course may be taken two times (6 credits total). Topic area will vary each time offered.

7806. Seminar: Trends in Mass Communication. (3).

A study of a critical issue or issues facing communications today. This course may be taken three times (9 credits total). Topic areas will vary each time offered.

7807. Seminar: Mass Communication Research and Theory. (3).

A survey of specialized areas of mass communication research and theory with an analysis of the tools necessary for studies of a historical, theoretical and statistical nature. This course may be taken two times (6 credits total). Topics will vary each time offered.

7808. Seminar: Mass Communication and Society. (3).

A study of the interrelationships between mass communications, the individual and society. This course may be taken two times (6 credits total). Topics will vary each time offered.

7842. Techniques for Television Teaching. (3).

A study of the techniques involved in producing, teaching, and classroom utilization of instructional lessons, emphasizing the use of visual materials, the teacher's appearance on camera, and methods of lesson preparation, with practical experience in the television studio.

7931. Seminar in Problems in Speech Education. (3).

Special study of selected current problems. Individual studies will be pursued with group analysis and discussion at regular class meetings.

7991. Seminar in Comparative Media. (3).

To demonstrate through intensive analysis what happens to the form and content of a creative work in its various adaptations: novel, condensation, stage, movie, and television. Open to all Speech and Drama majors and English majors.

7993. Special Problems. (1-3).

Individual investigation of special research projects not included in thesis.

7994. Special Problems. (1-3).

(Same As Above)

†7995. Production Thesis. (3-6).

Creative performance or production project suitable for public presentation. Project to be determined in consultation with and directed by the student's supervisory committee.

†7996. Thesis. (3-6).

† Grades of S, U, or IP will be given.

TECHNOLOGY

PROFESSOR W. T. BROOKS, *Director*

Room 205, Technology Building

In the Division of Engineering Technology the Master of Science Degree in Technical Education is offered either with a thesis (Plan A) or without thesis (Plan B). Teachers and prospective teachers of technology may select either plan. Those teachers planning to pursue work beyond the Master's Degree are encouraged to select Plan A. Students will consult the departmental adviser as to the program of study. The basic requirements are as follows:

Prerequisites: A minimum of 18 semester hours in an undergraduate technology program or related area.

Requirements: (1) A total of 33 semester hours for candidates not writing a thesis; (2) A total of 30 semester hours for candidates writing a thesis; (3) 7090 Research in Technological Education and a related statistics course must be completed by each student; (4) No less than 9 semester hours may be taken in one specialization area; (5) No less than 9 semester hours may be taken in professional-technical course work; (6) Candidates for the degree must pass a comprehensive written examination conducted by three staff members designated by the student and his adviser. The written examination will be administered once each semester and once during the summer term on a date published by the division. A follow-up oral examination is optional with the examining committee.

PROFESSIONAL-TECHNICAL

7001. Foundations of Technical Education. (3).

A study of occupational shifts resulting from recent advances in science and technology. The changing nature of the labor force, economic and sociological implications of automation and various contemporary sources of power. Attention will be given to the educational programs needed to meet technical and skilled manpower requirements. A study of the development of technical education and its function, philosophy, trends and types of Industrial Arts, Vocational-Industrial, and Technical Education programs.

7002. Technical Education Program Planning. (3).

Program and curriculum development in Industrial Arts, technical institutes, junior colleges, and area vocational-technical schools. Problems of college students and their adjustment to college-level industrial and technical subject-matter. Professional problems, ethics and advancement of the technical teacher. A detailed study of curriculum design including the interrelationship of mathematics, science and technical courses in technical curriculum. Selection and arrangement of teaching content, methods and preparation of assignments.

7003. Administration and Layout of Technical Educational Facilities. (3).

The functions of administration and supervision; problems involved in the organization and operation of technical and vocational programs. For administrators, supervisors of vocational-technical education, and those wishing to prepare for such positions. Principles and practices underlying the planning and designing of shops and laboratories in industrial and technical education.

7005. Measurements and Evaluation of Products, Skills and Technical Knowledge. (3).

Criteria and instrument development, testing techniques and appraisals. Special emphasis given to the principles and methods of evaluation of progress in laboratory and construction of pertinent and effective evaluative devices.

7006. Instructional Aids for Technical Education. (3).

Construction and use of teaching aids for technical subjects. A study of manufactured aids and the production of non-commercially available aids to facilitate comprehension of industrial processes and technological principles involved. Emphasis will be given to visuals, mock-ups, working models, and other such aids.

7090. Research in Technological Education. (3).

Analysis of the materials, methods, and techniques of research available in technical education. Emphasis on the design, investigation, and reporting of research studies relating to technology and technical education.

7091. Studies in Applied Technology. (3-6).

A course designed to encourage field research where theory learned in class is applied to a selected problem existing in industry or technical education. Emphasis is placed upon the scientific approach to solving a given problem. Practical teaching experience in the form of an internship program will be required for inexperienced teachers as a part of this course.

†7996. Thesis. (3-6).

This course will involve writing the thesis and will emphasize the adequate setup of the problem, the collection of the data, their use, and conclusions to be reached. The students must present in writing a proposal that is acceptable to his graduate committee under whose direction the thesis is to be written.

SPECIALIZATION COURSES

ARCHITECTURE

7600. Advanced Mechanical Design. (3).

Advanced environmental architecture correlated with the practical design of utility plants and structures will be studied in relation to isolated self-contained industrial plants.

7601. Architectural Graphics. (3).

Techniques of contemporary presentation applicable to architectural design with emphasis on advanced perspective and delineation. Computer applications and calibration table will be utilized for theoretical procedures. Practical problems will be utilized to develop the creative capacities of mature students.

7602. Problems in Architectural and Construction Technology. (3).

Study and research of specialized problems in creating up-to-date structures and developing efficient construction methods. Project work oriented to the individual student in advanced areas of architectural or construction technology.

CONSTRUCTION

7103. Theory of Construction Technology. (3).

economic factors are also of consideration. Survey of contemporary concepts involved in planning, production, fabrication, and erection. The inter-relationship of construction materials and

7105. Construction Planning and Scheduling. (3).

The study and practice of contemporary methods used in construction planning and scheduling. Emphasis will be on the Critical Path Method-CPM- in construction with computer application. Solution of actual problems will be stressed.

7106. Construction Equipment Cost Analysis. (3).

A thorough study of the different elements of construction cost—one being equipment. The annual cost, depreciation, replacement, and retirement of construction equipment. Benefit—cost ratio. Income tax influence on buying of new equipment. Other aspects of construction cost. Computer application in the construction cost analysis.

DESIGN AND DRAFTING

7253. Technical Illustration. (3).

A study of the various media used by the technical illustrator to produce camera-ready art. The student will be required to display proficiency and mastery in the use of pen and ink illustrations.

7257. Machine Design. (3).

A course dealing with standard machine parts, sub-assemblies, and design problems. Each student will be required to design at least one simple machine.

7258. Tool Design. (3).

An introduction to the design and layout of cutting tools, gauges and similar tools. Mass production techniques are considered.

7259. Design Problems. (3).

A consideration of advanced drafting room practice. The student makes application of his knowledge of mathematics, science and drawing.

7261. Problems in Graphics. (1-4).

An intensive study of selected topics in design or drafting. Individual student initiative will be rigorously stressed.

ELECTRONICS

7800. Problems in Electronics. (3).

Individual study in any field covered by senior undergraduate courses as approved by advisor.

7801. Precision Measurements. (3).

Review of electronic fundamentals and circuits precedes study of sensors, servos and analog devices, and the combination of these and other components into measuring instruments.

7811. Technology of Electronic Communication Systems. (3).

Engineering and economic aspects in the design and operation of publicly and privately owned communication systems.

7821. Advanced Microwave Techniques. (3).

Further investigation into lines, wave guides, oscillators, mixers and amplifiers operating in the microwave spectrum, emphasizing advanced techniques of testing and measuring performance of components and systems.

7832. Advanced Digital Circuit Technology. (3).

Technology of logic circuits, counters and memory devices as used in modern digital computer systems. Practical measurement and maintenance techniques as applied to actual computer devices.

INDUSTRIAL ARTS

7204. History and Philosophy of Industrial Arts Education. (3).

The historical developments of industrial education; types of programs, philosophies, and trends as related to the total school program.

7498. Curriculum Building in Industrial Arts Education. (3).

Theoretical background and experimental approach to curriculum improvement in industrial education on the elementary, junior and senior high school levels.

7596. Current Trends and Issues in Industrial Arts Education. (3).

Investigation of current laboratory arrangements, materials, supplies and methods in instruction compatible with the industrial education programs.

MANUFACTURING

6460. Motion and Time Analysis. (3).

A study of methods improvements, motion economy, and the development of time standards by direct observation, predetermined time standards, and synthesis.

6462. Inspection and Quality Control. (3).

Inspecting products and controlling the quality through the use of statistical techniques. Topics for study include administration of inspection, tolerance systems, gaging, sampling inspection plans, frequency distributions, control charts for variables and control for fraction defective and defects per unit. PREREQUISITES: Management 2711 or Permission of instructor.

6464. Production Control. (3).

The planning and control of production with emphasis on intermittent and continuous manufacturing. Fields of study include forecasting, designing control forms, using visual controls, scheduling, dispatching, preplanning, and using critical path techniques.

6466. Plant Layout. (3).

A study of plant design with respect to material handling, machine location, auxiliary services, capital requirements, safety, and personnel organization.

7401. Advanced Motion and Time Analysis. (3).

Advanced methods in time and motion study, balancing operations; learning curves, work sampling, memomotion and chronocyclegraph studies, fatigue effects, determination and application of elemental time data, statistical methods in time study.

7402. Advanced Quality Control. (3).

Advanced statistical methods applied to quality control problems, significance tests, correlation analysis, sequential sampling, analysis of variance, design of experiments, principles of reliability.

7404. Production and Inventory Control. (3).

The planning and control of inventory and production by means of statistical analysis of problems, simulation techniques, and mechanized execution of inventory and production control functions.

7406. Advanced Factory Layout and Materials Handling. (3).

A study of the redesign or renovation of existing or addition of new plant facilities, flow patterns, machine selection and location, estimate of unit costs, estimate of capital requirements.

7408. Production Processes. (3).

A coordinated study of manufacturing processes and equipment, operation sequence planning, economic aspects of equipment selection, tooling and processing a product from product design to final assembly for quantity production.

7410. Problems in Manufacturing. (3).

A study of specific manufacturing problems with emphasis on solution development for an actual manufacturing situation. Problems will be selected through agreement of adviser and student.

7422. Machine Tools. (3).

Design fabrication and operation of tools and equipment in industrial and manufacturing operations.

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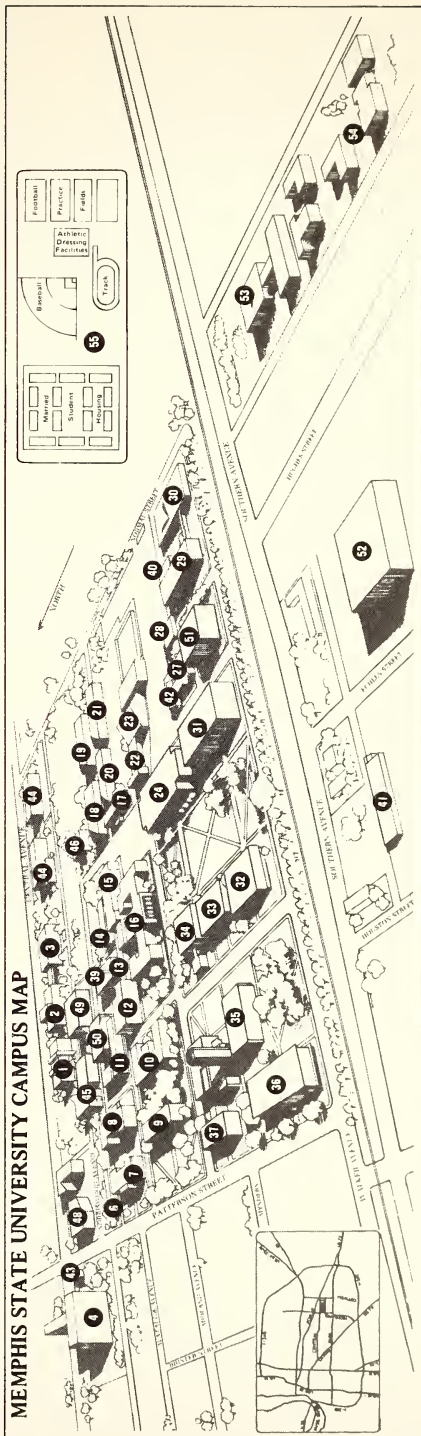
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|-------------------------------------|---------------------------------|---------------------------------|---------------------------------|
| 16. Administration Building — AD | 44. Engineering — EN | 14. Maintenance Building | 41. Printing Services |
| 42. Art Annex — AA | 44. Engineering Library — EL | 15. Manning Hall — MN | 45. Psychology Building — PY |
| 11. Art Building — AB | 23. Field House — FH | 49. Math and Foreign Lang. — MF | 8. Rawls Hall |
| 40. Athletic Office | 54. Fraternity Row | 18. McCord Hall | 21. Robison Hall |
| 35. Brister Library — BL | 27. Guid. and Stu. Personnel—GP | 50. Meeman Journ. Bldg. — MJ | 17. Scates Hall — S |
| 19. Browning Hall | 51. Graduate Sciences Building* | 34. Mitchell Hall — MI | 31. Smith Chem. Bldg. — SM |
| 13. Cafeteria | 22. Old Gymnasium (WKNO-TV) | 10. Mynders Hall | 55. South Campus |
| 30. Campus School — CS | 20. Hayden Hall | 3. Music Building — MU | 28. Special Educ. Building — SE |
| 4. Central Towers | 39. Heating Plant | 7. Nellie Angel Smith Hall | 2. Speech and Drama Bldg. — SD |
| 33. Clement Humanities Bldg. — CL | 43. Information Center | 53. New Men's Dorm | 46. Student Health Center |
| 48. College of Bus. Adm. — BA | 37. Johnson Hall — JN | 6. Panhellenic Building | 44. Technology Building — T |
| 29. Education Building — ED | 12. Jones Hall — JO | 36. Patterson Building — PT | 24. University Center |
| 32. Ellington Biological Bldg. — EB | 1. Law Building — LW | 52. Physical Ed. Building — PB | 9. West Hall |
| | | | Speech and Hearing Center — SHC |

*Completion Expected in 1972-73

Locations not shown on campus map. Chuclissa — CHU

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